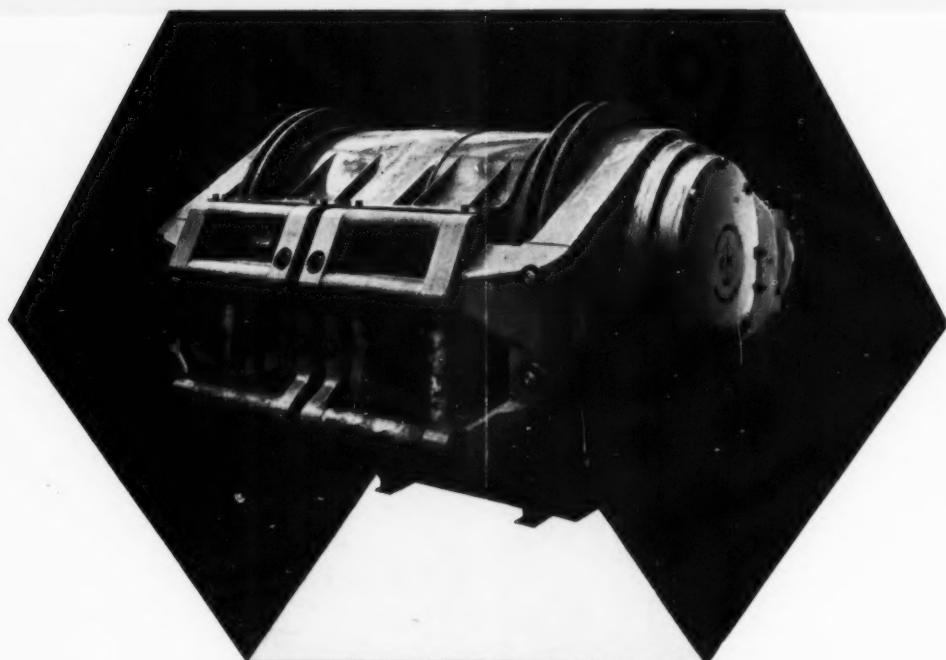


The Mining Journal

LONDON, NOVEMBER 9, 1956

Vol. 247. No. 6325.

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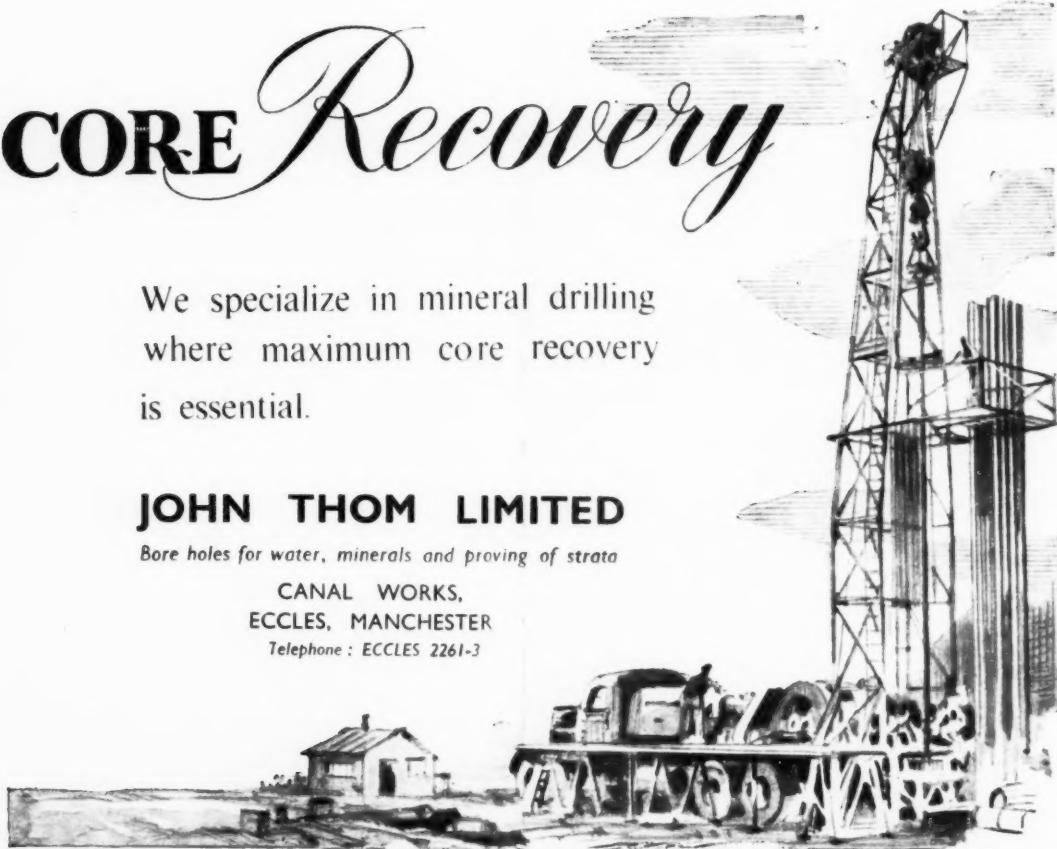
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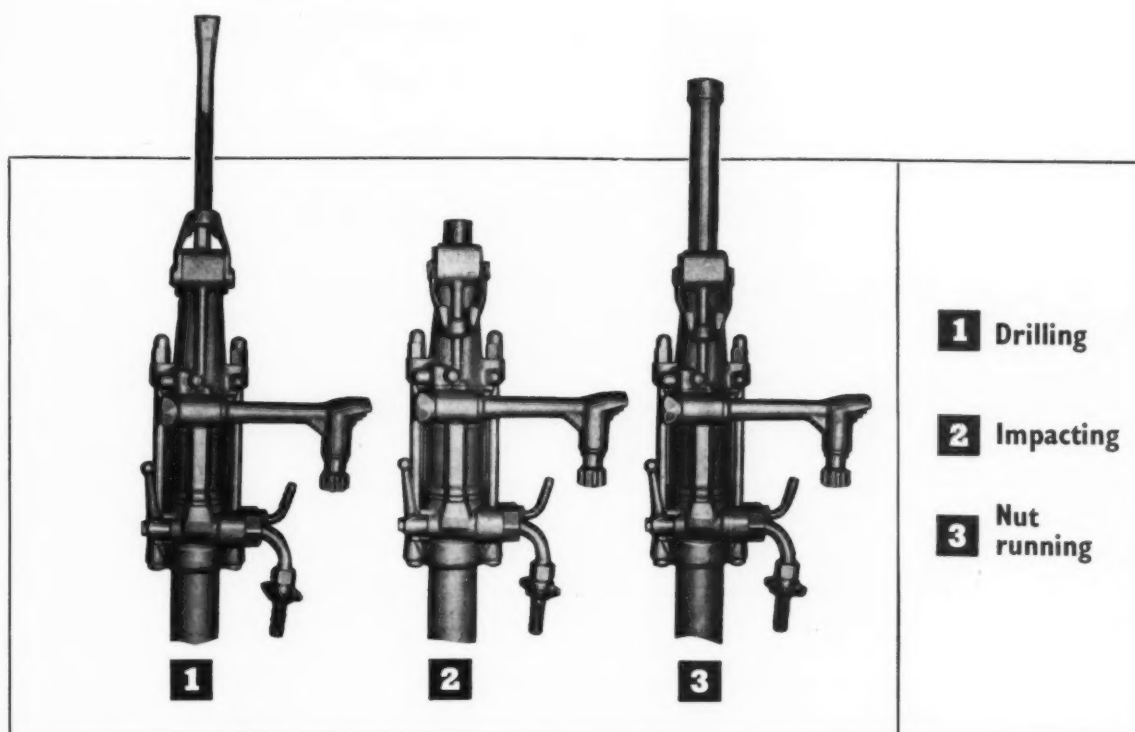
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The correct feed pressure can be set prior to drilling—depending on existing rock conditions. The 'Falcon' seldom requires any further adjustment if the drilling conditions remain unchanged. If fissured rock is encountered, the operator can temporarily cut off the feed by a quick release button with immediate effect.

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Length Collapsed	with 24-inch feed	57 ins.
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The Mining Journal

London, November 9, 1956

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A New Deal for Mine Managers ?

PEOPLE who talk — or still worse who write — about “management” as a subject for study are, even to-day, viewed all too often with suspicion by the “practical man”, to whom management know-how is no more than accumulated personal experience and leadership something with which you either are, or are not, endowed at birth. In most parts of the world the study of management is still bedevilled by traditional thinking in almost every industry. Even engineers, who have been trained to think scientifically in relation to the technology in which they are specialized, often revert to an empirical approach when confronted by management problems. Of few industries is this more widely true than of mining.

Beginning this week we are publishing a short series of articles on mine management in South Africa, with particular reference to the difficulties imposed on the mine manager by the nature of the organization structure normally to be found in South African mines. The author, Professor R. A. L. Black, is head of the Mining Department of Witwatersrand University.

The analogy of the ship's captain, which is so frequently employed in relation to the task of the mine manager, is an apt one because it underlines how vital it is that the ultimate responsibility for the progress and safety of the mine should be in the hands of one person. Mining is a hazardous business and nothing is more corrosive to efficiency or discipline than any ambiguity in regard to who is running the ship—or rather the mine.

It is when one comes to consider the relationship between the mine manager and his subordinates that the analogy ends. On a mine it is by no means unusual to find ten or twelve persons reporting directly to the mine manager. Such a situation on board ship would be bedlam, and the fact that so many mines do in fact contrive to operate under these conditions is above all a tribute to the capacity of human beings to improvise and to adjust themselves to essentially impractical relationships. Moreover, it masks the extent to which the efficiency of even the most able of mine managers must be impaired by an organization structure which requires him to pay undue attention to detail and routine at the cost of depriving him of the time to sit back and think—a process for which there is, unfortunately, no substitute.

It is this problem of the streamlining of the organization structure which is the theme of Professor Black's first article: while his succeeding articles will be concerned with two vital pre-requisites for the successful introduction of the kind of organization structure which he advocates.

The first of these is quite simply a matter of management training. If the mine manager is going to delegate more of his duties to subordinates, he must have under him men who, in addition to their technical qualifications, are managerially equipped to assume added authority and responsibility. On a great many mines it is precisely because of the absence of these competent subordinate managers that the mine manager is inclined to try to make good this deficiency by dealing with everything (or more accurately with everyone) himself.

Incidentally, the more complex type of organization structure proposed by the author calls for a higher degree of self-discipline in the personal relationships of the more senior members of the organization, which can only come from a real understanding of the purpose of the proposed changes, and of the nature of the new posts which have in consequence to be filled. This in itself can only come from sound management training. This is particularly true when we come to consider the impact of the specialist (whatever his field of specialization) on the direct chain of command from the mine manager through to the shift boss. It is this problem which forms a part of Professor Black's third article, in which he will also go on to consider the relationship both of the specialist and of the mine manager to the "higher command" of the typical mining group.

Professor Black's objective analysis of all these related problems is particularly welcome in a field, in which so many of us are apt to think subjectively. At the same time, it is precisely because of this tendency that *The Mining Journal* must emphasize to its readers (and more especially to those in South Africa) that these articles are not intended as criticism of any specific mine or group of mines. Professor Black is dealing with problems for which, broadly speaking, the mining industry as a whole has yet to find a solution—and this is by no means true of South Africa alone. Much of what he says can, for example, be said with equal, if not greater, force of the mines run by our own National Coal Board. It is perhaps true that greater progress has been made in the mines of North America than elsewhere, more particularly with the super imposition of management training on the engineer's initial technical equipment. But even so, the distinction is only one of degree.

It is too much to expect that there can be anything like unanimity among our readers on the solutions propounded by Professor Black. The problems themselves are, however, real ones, of which all those engaged in the mining industry are acutely conscious, and we hope that any of our readers who cannot go all the way with the author in his proposals, will at least be stimulated to the point of producing some alternative solutions of their own.

In the last analysis the soundness of new management methods can only be tested in operation by the industry itself. It seems to us, however, that the experiments are well worth making. Moreover, the changes could be made now in a few selected mines, even though the supply of adequately trained personnel may not be sufficient for their more general introduction.

THE RICHES IN BRITAIN'S BURIED SOCK

The situation in the Middle East changes with such kaleidoscope rapidity that any comment we might venture to make before putting this issue "to bed" is liable to be outdated before the ink from the printing presses is dry. At the time of writing it can be said, however, that the more explosive elements in the situation seem to have been brought under control and prospects for a favourable outcome have improved.

Once again interruption of the normal channels of supply has underlined the critical dependence of the United Kingdom on the maintenance of sea communications. Among commodities particularly affected by blockage of the Suez Canal are a number of materials essential to British industry and defence. Tin, manganese, mica and ilmenite from Far Eastern countries; lead and zinc from Australia, are examples which immediately come to mind.

A small country with a large population, Britain's mineral resources other than limestone, clays and—dare we add?—coal, are totally inadequate to support a high level of industrial production. Only by reversal to an agricultural or pastoral economy with consequent reduction in population could self-sufficiency in raw materials be achieved. But to argue that because we cannot hope to supply more than a fraction of our requirements from indigenous sources there is little to be gained by utilizing such resources as we possess, is not merely illogical and short-sighted but downright dumb.

With almost monotonous frequency new projects for the revival and expansion of Eire's once almost derelict mining industry are being announced. This transformation has come about largely as a result of Canadian interest in the potentialities of Eire's mineral resources. Canadians are reputed, rightly or wrongly, to adopt a cautious attitude towards investment opportunities across the ocean. It is noteworthy, however, that one Canadian firm, the Mogul Mining Corporation, recently increased its capital and it seems a safe bet that the additional capital will be used in part to finance Mogul's growing commitments in Eire.

Another reason for the phoenix-like resurgence of Irish mining is, of course, the refreshingly co-operative outlook of the government, which, indeed, seems to consider that mining expansion could make a significant contribution towards the attainment of a more balanced economy. Eire, in fact, is giving the utmost encouragement to mining in the belief that the rewards to the country will be rich indeed.

The fruits of this policy are already apparent in growing evidence that the Republic's mineral resources, far from being almost exhausted, are considerably more extensive than previous exploration had suggested. Signs are not lacking that in Britain, too, intensive exploration and development by modern methods could bring equally encouraging results.

Unfortunately the unimaginative attitude of successive British governments has effectively discouraged prospecting and exploration, yet even restrictive legislation and crippling taxation have not entirely succeeded in stifling interest in our mineral resources, for despite existing handicaps a few deposits are being actively exploited at the present time. We have little doubt that in more favourable conditions metal mining in Britain, too, could be induced to blossom again with greater profusion and vigour than at any time in its long and colourful history. It might well make a significant contribution to our requirements of minerals and metals, thus helping to relieve the perennial strain on sterling and providing some degree of security against unfavourable developments in territories outside our control.

A country which is content to let its own natural resources lie dormant while importing vast quantities of materials from overseas might be likened to a man who keeps his savings in an old sock under a loose floorboard in his bedroom. Is it too much to hope that some day we shall realize that there is no greater form of wastage than the hoarding of natural resources which could be usefully put to work?

Here is indeed fertile ground for the activities of the United Kingdom Metal Mining Association, which held its first annual general meeting at the beginning of this week. So far the Association has given no indication as to the lines on which it is proposing to accomplish its objective of promoting and encouraging the mining of metals and minerals (other than coal) in the United Kingdom. Its first progress report will accordingly be awaited with considerable interest.

ATOM POWER UNDER FIRE

Whilst the rest of the world is looking towards industrial nuclear power as the solution to the problem of satisfying growing energy demands, U.S. coal operators are currently criticizing the decision of the government to build atom power stations. Recently the President of the Southern Coal Producers' Association described the proposal to build a series of atomic energy plants for purely civilian use as a "leftist, collectivist proposition".

Presumably it is quite acceptable for the U.S. to harness the atom in order to destroy, but on no account must this power be put to peaceful use if the pockets of the coal operators are to be touched. Obviously the President of the S.C.P.A. does not take kindly to the thought of power being produced other than in coal-fired power stations for the renewed charges that an oil cartel was dumping residual oil on the East Coast to the detriment of the bituminous coal industry, asserting that this oil was approximately equivalent to 50,000,000 tons of coal per year.

One of the chief fears of the operators, is that by building atomic power stations, the government gets into the electricity supply business by the back door i.e. the atomic energy route. The coal operators have had bitter experience of "collectivist" activities in their dealings with the Tennessee Valley Authority.

Whether or not atom power does become competitive in the U.S. the coal mine owners seem to be magnifying the threat to coal markets, for at a recent solid fuels conference sponsored by the American Society of Mechanical Engineers and the Institute of Mining Metallurgical and Petroleum Engineers, it was stated that demand in 1975-1980 would probably be 1,000,000,000 tons—twice current production.

BOOM IN MOROCCAN MINING

With the coming of independence in March and the re-establishment of internal security since July, the Moroccan mining industry is resuming full production and in several cases hopes are high of record output this year. The Minister of Industry and Mines, Si Thami Wazzani, has announced a five-year development plan in which the mining industry will play the larger part.

In October Si Wazzani announced that a super-phosphates factory will be opened in Safi next year to turn out 50,000 tons of super-triple phosphates plus 50,000 tons of sulphuric acid a year. Employing 1,000, the plant will entail an investment of nearly £1,000,000 by the Sherifian Phosphates Office. The Louis Gentil phosphate mines (1955 output: 1,339,000 tons) exports its production by rail through the port of Safi and part of it will be processed by the new factory.

In the first seven months of 1956, Morocco produced 3,279,289 tons of phosphates as compared to 3,085,322 tons in the same period of 1955 from its Khouribga and Louis Gentil mines. The figure is a new record. Last year total production passed 5,000,000 tons. This year it is expected to be much nearer 6,000,000 tons.

The Ait Amar iron mines operated by the Société Marocaine des Mines, which was so badly hit in August last year when 22 European personnel was massacred in a tribal revolt, has already doubled production in the first nine months of this year with 336,000 tons compared to 176,000 tons in the same period last year. Deliveries totalled 322,000 tons as compared to 198,000 tons.

Insecurity during the first half of the year reduced output of cobalt ore at Bou Azzer mine operated by an affiliate of the Omnium Nord Africain. In the first seven months 4,094 tons of ore were mined as compared to 4,382 tons in the same period of 1955. But next year total output is expected to reach the 10,000 ton mark, thanks to the installation of a new washery capable of increasing output by 2,000 tons a year.

The installation, which will be ready for operation before the end of the year, entailed the construction of an aqueduct nearly 20 miles long to bring the necessary water from the nearest suitable source in the semi-desert area of the Saharan Atlas where the mine is situated.

Officials of the Royal Asturian Mines conferred with the Sultan on October 15 to obtain an assurance from him that adequate security measures would be taken to ensure the exploitation of a new lead mine at Jebel Auouam in the Middle Atlas. The mine was closed in March this year when rebel bands terrorized the mountainous and forested area.

The Jebel Auouam lead deposit is a vein almost two miles long varying between 8 in. and 5 ft. in thickness and up to 300 ft. in depth containing ore with a 7 per cent metal content and capable of producing 8,000 tons annually. Worked in the 17th century by the Portuguese, it was taken over by the Asturian in 1933 and, after a detailed survey was made after the war, exploitation was begun in 1955 to be halted by insecurity less than a year later.

The Royal Asturian company operates important lead-zinc mines at Touissit and Sidi Bou Othman, the latter beginning production in 1953 with a flotation plant. In the first half of this year, the company produced 83,562 tons of lead and zinc concentrates compared to 88,589 tons in the first half of 1955.

The Nador iron mines in the former Spanish zone are expected to produce 1,000,000 tons of ore for the first time this year. Last year's output amounted to 722,000 tons of which 40 per cent went to Spain and 30 per cent to Britain. The ore is of a particularly good grade with 60 per cent of metal and 4.5 per cent of silica. This year's high production will be the result of improvements in handling and rail transport equipment.

Most Moroccan manganese mines report normal progress and total production this year is expected to be at least as high, if not higher, than last year (371,541 tons of metallurgical and 39,773 tons of chemical manganese in 1955).

Si Wazzani has also announced that plans are in hand for the erection of a plant in Casablanca which will concentrate cobalt ore from the Bou Azzer mine before it is exported. The same factory, it is understood, will process antimony ore for export. Another plant would utilize Jerada anthracite and Moroccan pyrites for the production of pig iron, he said, and another factory would be built for the manufacture of bi-calcium phosphates.

In addition, the Minister declared that more extensive petroleum research work was envisaged in the near future, and that the Bureau de Recherches et de Participations Minières would extend its activity to include the whole of the former Spanish and French zones and would co-operate with more and more private mining companies.

Finally, Si Abdelkader Benjelloun, Minister of Finances, has announced that 1,500 Moroccans would go to Belgium and 1,000 to France in the near future to work and learn skilled trades in European mines, thus alleviating the unemployment crisis in Morocco and at the same time creating a nucleus of trained miners who could be absorbed by the expanding Moroccan mining industry.

How to Make Time for the Mine Manager to Manage

THE bigger an industrial undertaking, the more complex and formal must be its system of control and its structure of management. The gold mines of the Witwatersrand are nearly all big, many of them with total payrolls of over five thousand people and employing large amounts of capital equipment. Moreover, a mine is in several ways more complex than most factories of a comparable size. The mining operations themselves are usually divided between individual shafts some distance apart; and are spread out underground and difficult to supervise. Important work is in progress twenty-four hours a day, seven days a week, and in nearly all the operations the ever-present element of danger and the possibility of a serious accident call for constant vigilance on the part of management.

A mine then is a living community, more complex and varied in its activities than the normal factory which opens its gates in the morning and shuts them again at the end of the day. The general manager of even the largest factory could during the course of a week see something of the work in progress in every single part of his factory. The manager, on the other hand, of a typical Witwatersrand mine, would require to give up his entire working mornings for at least two or three months if he were to attempt to do the same. Since he cannot possibly know intimately the situation in all parts of the mine under his control, he must delegate wide power and responsibility to subordinate managers, and indeed the law in South Africa insists that he does so. However, the ultimate responsibility for the safe conduct and efficiency of underground operations rests with the mine manager, and in order that he can discharge this responsibility effectively, the subordinate managers must report and consult with him at length and at frequent intervals. In addition, the mine manager carries the final responsibility for the entire mine organization. The principal officials in charge of departments, who normally have more or less direct access to the mine manager, on a large Witwatersrand mine, are listed below.

Designation	Responsibility
1. Assistant, Sectional or Underground Manager.	Underground production.
2. Mine Secretary	General office, time offices, stores, accounts, statistics and security.
3. Resident Engineer.	Surface and underground engineering departments and workshops.
4. Chief Compound Manager	Native compounds or hostels.
5. Mine Medical Officer	Native hospital and medical services.
6. Reduction Officer (and Uranium or Metallurgical Superintendent).	Metallurgical plants.
7. Chief Assayer	Assay department.
8. Chief Surveyor	Survey and sample departments.
9. Chief Geologist	Geology department.
10. Ventilation Engineer	Ventilation department.
11. Chief Study Officer	Study department.
12. Labour Control Officer	Workstudy, standards and efficiency.
13. Personnel Officer	European employment and personnel departments.

Although on some mines responsibility for the production and ancillary mining departments is delegated to one assistant or senior underground manager, nevertheless on

most mines there are a great many heads of departments who have daily access and responsibility to the mine manager himself. It is common practice for nine or ten individuals, each representing a separate function, to report direct to the mine manager. If, as is not unusual, there are two or more section managers of equal status, the mine manager is faced with the extra complication that he must in practice act as head of the mining department as well as being mine manager.

By R. A. L. BLACK, A.R.S.M., A.M.I.M.M.

This article, which we discuss elsewhere in an editorial note, is the first of a short series. The author is Professor of Mining at Witwatersrand University.

It is accepted good administrative practice that an executive should have not more than 5 or 6 subordinates, if they represent separate functions, directly responsible to him. In the case of the chief executive on a mine, it is suggested that this number should certainly not exceed five since, from the nature of mining operations, effective control and co-ordination, the mine manager's first daily tasks, are not easy matters. The less he has to control personally and the fewer people he has to co-ordinate, the more time he will have to devote to constructive thinking, long-term planning, and to keeping in touch with what is going on at all levels. If there are to be fewer people responsible directly to the mine manager, it follows that there must be additional links in the chain of command at senior levels, and this would be highly undesirable unless full delegated responsibility is given to them to act within their own spheres. It is generally true that the lower down the chain of command quick and effective action can be taken the greater will be the efficiency of the organization.

The real task of senior management is not the taking of day-to-day routine decisions but the formulation and control of policy. Long chains of command with decision only possible at the top result in management becoming remote, impersonal, ill-informed and ineffective. On the other hand, for responsibility to be effectively devolved down the chain, it is necessary for the subordinate management to have a far wider and deeper understanding of management problems and techniques than is at present common among even senior officials. There has been a tendency in recent years for responsibility for the taking of decisions to be concentrated upwards; in many instances, indeed, responsibility has disappeared upwards over even the mine manager's head into head office. This is a most unsatisfactory trend which can only result in management becoming to junior officials and workmen a mysterious "they", unseen, unknown and ungetatable, to whom everything must be referred. Among the reasons for it have been the shortage of suitable men to fill posts in the middle ranks of management and the greater use of specialized skills in mining in recent years.

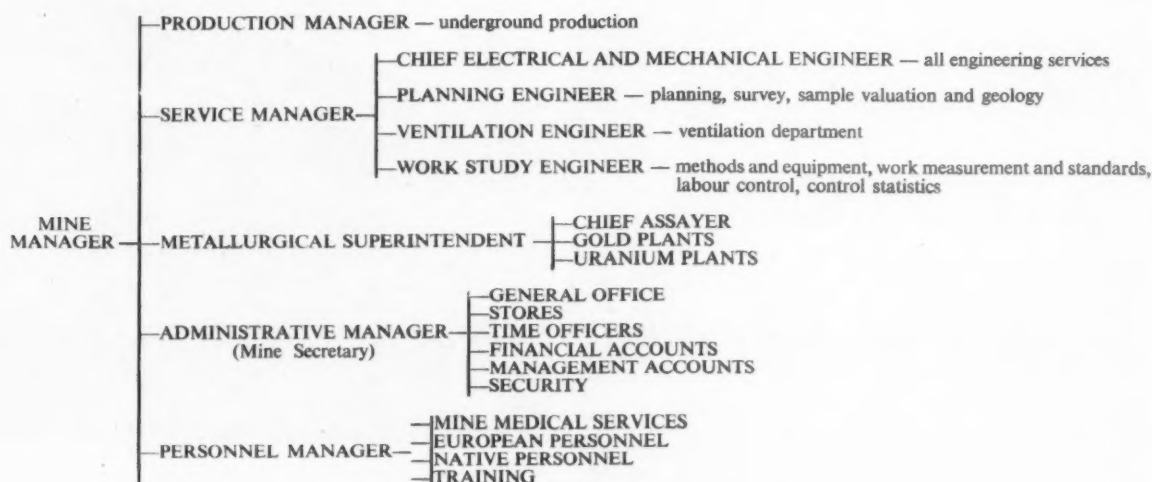


Chart of organization structure designed to reduce the number of subordinates whose activities the mine manager has to supervise personally

However, to concentrate authority in the person of the mine manager is no substitute for effective management lower down the scale of command; and the answer must be found rather in the better training and development of potential seniors. This will be discussed in a subsequent article.

There are, therefore, two main requirements for effective management on a mine: a stream-lined organization as far as the mine manager's direct responsibilities are concerned to free him for creative work; and the devolution of as much delegated authority as possible down the chain of command. Taking the list of departmental responsibilities previously given and shaping it to accord with these principles, would give an organizational chart similar to that shown above.

It will be seen from this chart that responsibility for running the mine is delegated to five principal department heads, each looking after a function which is reasonably complete in itself, production, services, metallurgical plants, administration and personnel. The mine manager's routine task is to co-ordinate the work of these five people to achieve the overall programme for the mine. Each department is given a framework of policy and a budget in terms of production and cost within which to work. So long as they remain within the framework of the set policy and in line with their budget commitments, department heads have complete responsibility and authority. Deviations from agreed policy or budgets require the approval of the mine manager.

The firm split of line and staff responsibility is the main departure from current Witwatersrand practice. The Production Manager is free to concentrate on the immediate problems of production; and all technical departments, including that of planning, probably the most important of all services, receive the full-time attention of the Service Manager, who is not burdened with urgent day-to-day problems of production. Under him, planning, surveying, sampling, valuation and geology have been grouped in one sub-department since they are interdependent. Planning is intended to cover short-term planning for current production and the long-term planning of future layouts from the first tentative sketches to the final agreed operating schedules.

The appointment of a work study engineer is relatively new to South African mining. His duties are to study work wherever it is being performed on the mine in any department, to suggest and test new methods or equipment, to advise on and set standards for labour requirements and performance, and to control the distribution of labour to meet

the agreed requirements. The work study engineer's department must work in close collaboration with the planning and production departments, and also with the management accounting department, for it is from his department that the accountant will obtain most of his information for cost and budgetary control purposes.

The appointment of a Metallurgical Superintendent is already made on some mines where there are both gold and uranium plants.

Administrative Manager is a more accurate term to define the duties of the present Mine Secretary. An important new task assigned to him is the preparation of budgetary statements and the presentation of management accounting information.

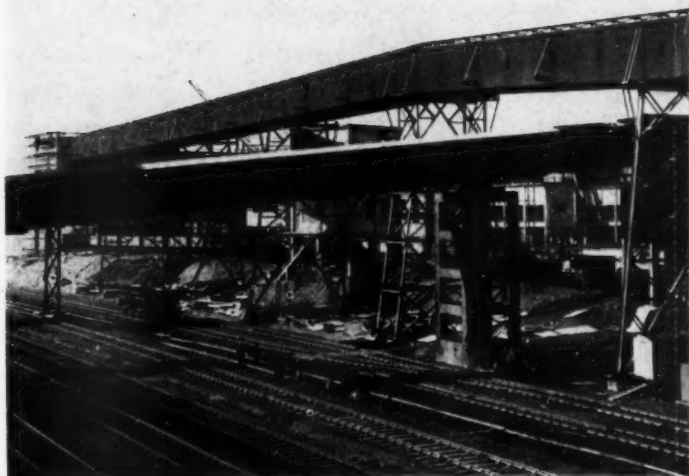
It is in the last of the main department heads that the second principal change from current practice is suggested, in the appointment of a Personnel Manager, who would have charge of all matters affecting either the European or the Native employees, their selection, employment, placement, training, advancement and working conditions, and, as far as they are the concern of the mine, their recreation, housing, feeding, health and welfare. This would be a step forward, bringing the mine in line with practice in other industries.

Out of the five main departments suggested, two, the Production and the Metallurgical Departments, are direct producers, and the remaining three are functional departments whose purpose is to provide essential services to the producing departments. The fact that all have equal access to the mine manager in no way detracts from the status of the producing departments. The head of each producing department has supreme authority as far as matters of executive or line responsibility are concerned over his own or any functional or staff officials who may be assigned to duty with his department, but has no authority concerning the technical performance of their duties by members of functional departments. This is the responsibility of the service department concerned. Only the formal lines of direct authority have been shown in the diagram; in practice of course, there are innumerable cross lines of subordinate authority by which the service sub-departments fit at various levels into the production departments they serve.

The organization suggested is intended for a large mine producing, say, over 100,000 tons a month.

A somewhat simplified version would be more suitable for smaller mine.

Protection of Mine Surface Steelwork Against Corrosion



THE exceptionally corrosive conditions to which surface steelwork structures were subjected at Manvers Main Colliery, were solved by the application of the various protective paints designed to counter corrosive attacks that differed throughout the works.

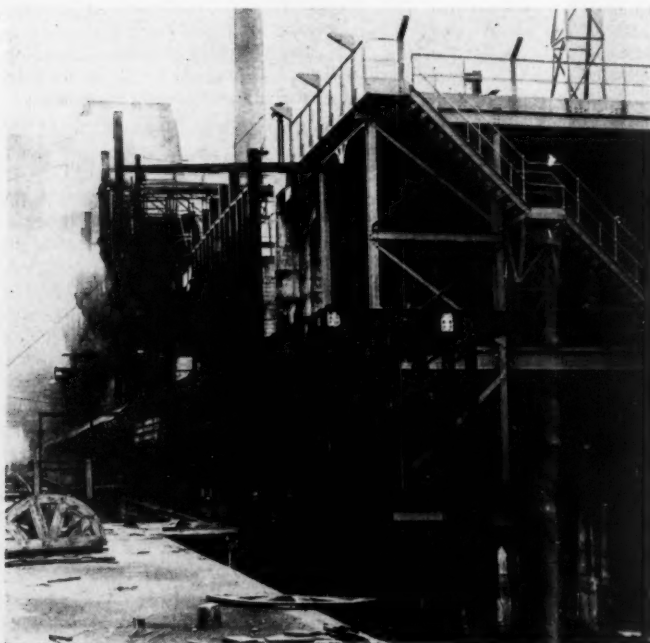
Work at Manvers Main includes the construction of 78 new coke ovens which, with the existing battery of 62 ovens, will make this one of the largest coke and by-products manufacturing plants in the country. The extensive range of chemicals produced in the by-products works from gas generated in the coke ovens will include many varieties of benzole and tar by-products in addition to the usual ranges of processed chemicals.

The thousands of square feet of structural steel, storage tanks and process equipment involved is under unusually severe attack. The atmosphere is constantly polluted with fumes of sulphuric and other acids sent out from the quenching section of the coke oven plant at regular intervals of about 20 minutes during continuous 24-hour operation, while there is additional direct attack from spillage

of highly corrosive liquids in the by-products plant, and further attack from corrosive material deposited on exposed surfaces by rain falling through atmospheres heavily charged with the sulphurous and other compounds.

Although the answer to these problems would be to remove the corrosive substances before they escape to the air, the cost involved would be prohibitive and out of all proportion to the benefits gained. It is, therefore, in a finishing paint system that the answer must be sought and it is confidently believed that the painting scheme devised through research and extreme practical tests by the laboratory teams of Evode Ltd., with the full collaboration of the contractors, will ensure that future costs of maintenance will be as low, and resistance to attack as high, as it is anywhere possible to guarantee.

It was at once clearly impossible to devise a paint system suitable for the whole of a site as large as Manvers Main, and it was therefore necessary to produce specific systems capable of withstanding particular conditions. When any new phase of painting was being considered, a full examina-



Above: Steel of overhead gantries protected with the same combination of paints, with the exception of aluminium sealer, as was used for the ram changing station

Opposite: The ram changing station painted and protected with Evode's red lead primer and Evodyne (chlorinated rubber) paint, aluminium sealer, undercoat and finishing coat

tion of conditions was undertaken on the site by technicians of Evode Ltd., and a representative of Simon Carves Ltd., the main contractors. This entailed both an examination of the site itself and a careful study of flow sheets, from which survey a suitable specification was drawn up. Special research was carried out to determine the conditions likely to be encountered in the more highly corrosive situations.

From the early stages of investigation and research a number of unusual complications had to be surmounted. Wind encountered when painting the exposed parts of conveyor structures and the tops of trestles, for example, caused the paint to surface dry very rapidly, with the result that bubbles of air were trapped on the painted surfaces. These later developed pin-holes and provided inadequate protection. Eventually this problem was overcome by developing a special solvent blend, so that the paint film remained fluid long enough for these bubbles to burst and the film to flow.

The use of Evode and Evodyne was recommended, the specification being varied in accordance with the site conditions and making reasonable allowance for corrosive attack of exceptional severity in certain places. Thus a four-coat painting system was proposed for every item of plant near the coke ovens. The first coat is of Evode red lead primer. This is then covered by a barrier coat of Evodyne aluminium paint, which provides a highly impermeable barrier to water and aqueous solutions. The third coat is an undercoat of Evodyne chlorinated rubber paint, highly resistant to attack by alkalis and acids. Finally, the finishing coat is of similar material in the required shade differing from the undercoat to provide identification of each coat.

Of those parts of the plant where corrosive conditions are not so severe, such as the interior steelwork of conveyors protected on the outside by asbestos cement corrugated sheeting, Evode primer has been used with two coats of Evodyne chlorinated rubber paint. Experience has proved that both these painting systems have excellent resistance to corrosion.

Incorporation of Neoprene

A protection problem of particular difficulty was presented in the bunker house handrails. These are periodically covered by condensed moisture from the coke quenching towers, from which a large volume of steam discharges, mingled with sulphur dioxide and other corrosive gases at intervals of 20 minutes throughout the year. For these handrails Evoprene paint, which incorporates neoprene synthetic rubber in its composition, proved the only known substance which can successfully withstand these arduous conditions for any appreciable time. A test panel of this paint has now been exposed on the site for more than six months, and displays no sign of corrosion even at the edges.

The great danger, in this atmosphere, is the inevitability of normal paint systems to be subject to chemical attack before dry, or during the course of application.

Experience has proved that Evoprene successfully resists chemical attack while the paint film is still wet, and that it is resistant to a moderately high temperature. Accordingly, Evoprene has been applied to the condensers and to those parts of the ram changing car which face the retorts.

It was essential that certain parts of the benzole rectification plant be highly resistant to corrosive attack by solvents such as benzole, pyridine and carbon disulphide. These materials are solvents for chlorinated rubber, so that paint containing this substance is not suitable for protection. Evonamel SR paint provided this necessary protection.

Optimistic Outlook for Steel Production

ON the subject of the outlook for steel, the most optimistic views prevail. In the years 1940-1955 world production was doubled and far from any acknowledgment that the industry has reached its zenith, still more ambitious programmes of development have been approved.

The upsurge of demand in the U.S. since the July strike has been such that plants have been working somewhat in excess of 100 per cent of rated capacity. Bookings already extend far into 1957 and during the next three years the industry plans to spend three billion dollars on additional equipment designed to increase capacity by a further 15,000,000 tons.

In the Federal Republic of Germany a continuing high rate of increase is anticipated and a survey by the United Nations Economic Commission for Europe (ECE) indicate that by 1960 Western Europe is expected to increase its capacity by 35 per cent.

Plans for Widening U.K. Production

British steel is also expanding its production plans for the next six or seven years. Owing to unforeseen causes—notably the three-month embargo on overtime imposed by the craftsmen engaged in the steel works—this year's crude steel output may fall slightly short of the target of 21,300,000 tons, but the industry has raised the sights for 1958 from 22,000,000 to 23,500,000 tons and the British Iron and Steel Federation is now talking of an overall output of 28,000,000 tons by 1962.

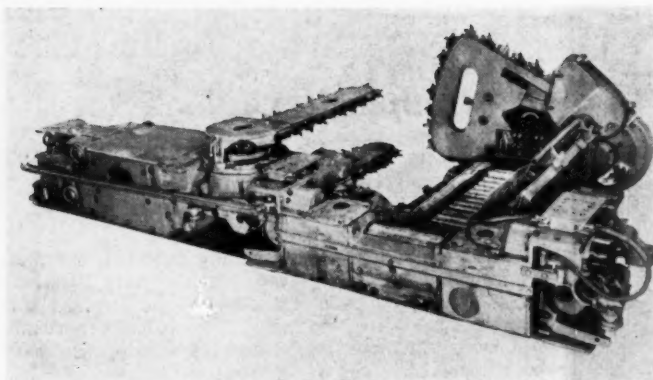
This would mean doubling the production of British steel in 15 years and, of course, a much heavier capital expenditure than has hitherto been contemplated.

During the past five years the steel investment programme has cost £286,500,000 and it is admitted that the current year's expenditure will be at a still higher rate. To finance further capital developments on such a colossal scale is a problem made all the more complex since the industry is undoubtedly working on narrowing profit margins.

Selling prices charged to British iron and steel users are strictly controlled and neither in 1955 nor in the current year when small price advances were authorized, did the extra charges fully cover the increase in the cost of production.

In May last the industry was left to "absorb" the rise in coal prices, railway freight charges and wage costs. Since then costs have moved further against the producer and it is not surprising that the industry has declined the government's invitation to join in the price freeze. A review of the present price structure is therefore now in hand and it is generally assumed that further adjustments—in an upward direction—will have to be conceded.

That is the probable explanation of the substantial rise in the tonnage of consumers' stocks of steel which at the end of June totalled over 4,000,000 tons. Nor is there any indication that any substantial reduction has since been affected. Users have evidently come to the conclusion that steel is better to hold than sterling and who shall say that they are wrong?



MECHANICAL CUTTING AND

LOADING IN COLLIERIES—V.

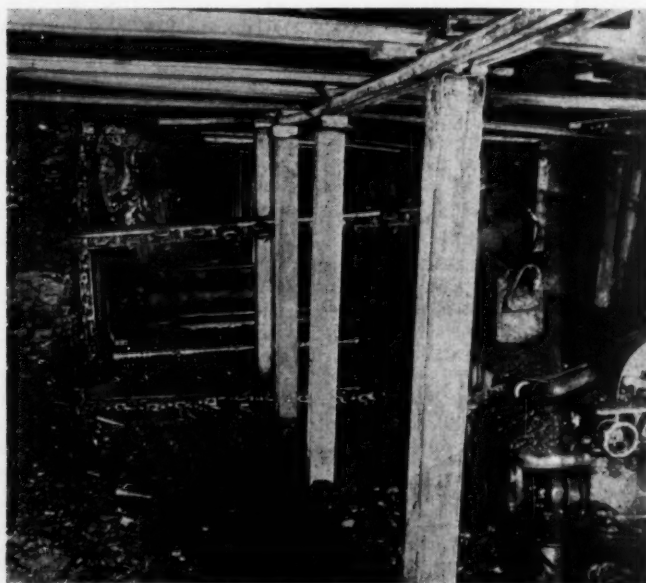
Types of Cutter Loaders

THE A.B. Meco-Moore low type cutter loader—a smaller version of the original machine—has been designed to work in seams of 3 ft. thick and above. Of these machines, 127 accounted for nearly half the power loaded output in Britain during 1954. Nearly 8,500,000 tons were handled at an average O.M.S. of 6.63 tons. Several machines produced over 3,000 tons per week and the best face O.M.S. over a 3 months period was 12.35 tons. During 1955 there were 142 machines working in seams varying between 3 ft. 2 in. and 7 ft. in thickness and the tonnage produced was 9,216,900.

The machine consists of two units. First, the cutting unit, comprises a haulage section built on conventional coal cutter lines, a motor unit containing two 60 H.P. fan cooled electric motors mounted side by side, and a gear head which drives the two horizontal jibs and transmits the power of one motor to the loading unit. Second, the symmetrical loading unit comprises gummer sections, loader gear box sections carrying the loader bars, the conveyor section and a reversible jib mounted vertically to cut at the back of the web.

The loading unit can be rapidly separated from the cutting unit and this must be done in order to turn the machine at the end of the cutting run. The cutter portion must be turned so that the haulage unit is once again at the front and the horizontal cutting arms rotated to the face side. The loading unit is able to work in either direction and need not be turned but is attached again to the rear of the cutting unit behind the horizontal jibs. The vertical shear jib is universally mounted and is easily reversed.

The machine is usually employed to cut and load on one shift and turned on the second shift but if three cutting units are used with one loading unit the time taken to turn the machine can be reduced to allow a second cut to start about 1½ hours after the completion of the first. The cutting units are positioned at each end of the face ready



By J. M. CAW

On this page is shown above the A.B. Meco Moore low type cutter loader, while below the A.B. Meco Moore cutter loader with adjustable turret is illustrated operating at a coal face underground.

The fifth article of the series devoted to power loading at coal seams of the United Kingdom commences a description of the machines used for cutter loading at longwall faces.

for quick attachment to the loading unit. Whilst this is being done the face conveyor is turned and the supports moved up.

The design is made flexible by the provision of a range of horizontal jib sizes reaching between 4 ft. and 8 ft. 4 in. from the machine, loader lengths between 3 ft. 5 in. and 7 ft. 0 in. and a shear jib cutting height of from 2 ft. 6 in. to 6 ft. 2 in. with an adjustment of plus 4 to 5 in. In addition, the top horizontal jib can be mounted on an hydraulically controlled turret at 2 ft. 11 in., 4 ft. 0 in. or 4 ft. 8 in. above floor level with a controlled range of + 7, 9 or 12 in. respectively. Power for elevating the turret is provided by an oil pressure pump driven from the cutter motor gearing and will operate the turret when the cutter motor is running. A slow speed of adjustment is incorporated for use when the turret height requires to be altered whilst the machine is cutting.

To enable the loading unit to work in either direction without turning it has been symmetrically arranged about the loader belt. The belt is of endless 3 ply construction with steel slats riveted to it and duplicate gearboxes mounted on either side. The driving chains are coupled to the steel slats. On each side of the belt a loader bar is placed which is fitted with picks to break up and lift any standing bottom coal on to the loader belt. Duplicate gummets operate at floor level and consist of large diameter transverse screws rotating inclined to the line of bottom cutting jib and discharging the holdings on to the face conveyor. For this reason a face conveyor with a height not exceeding 7 in. is required and experience indicates that a bottom loading conveyor gives the best results.

The drum of the haulage unit will hold 45 yards of $\frac{1}{2}$ in. wire rope and, with double rope haulage, the maximum cutting speed is 27 to 30 in. per min. The rate of travel can be reduced by means of a ratchet feed. Hauling slack rope can be done at a higher speed.

Best results using this machine are obtained as a rule from a face working "on end". Seams containing regular iron-stone or pyritic intrusions should be carefully considered as one or other of the jibs must deal with them and pick wear may be excessive. The face length usually worked varies between 130 and 150 yards. In line of face, gradients up to about 1 in 5 have been worked satisfactorily and gradients of about 1 in 7 dipping or rising in the direction of the roadway. Faces advancing to the dip at more than about 1 in 10 should be avoided if possible since the rate of loading is reduced by coal rolling on the loading conveyor of the machine. Advances of up to 9 ft. per day are possible with double shift working on a well organized face.

The main dimensions of the machine are length 17 ft., height 2 ft. 6 in. (min.), width 3 ft. 1 in. and weight about 10 tons.

The high type cutter-loader, which is virtually superseded by the low type described above, comprises an A.B. fifteen special longwall coal cutter with undercutting and over-cutting jibs and with an additional motor of the same type and horsepower mounted on top. The second motor drives the Meco loader portion and also the A.B. shearing jib which cuts at the back of the jib. The minimum height of seam to which it is applicable is about 4 ft.

A comparison of sizing given by Sidall and Thorpe¹¹

for a hand filled face and a cutter loaded face on the same seam is given below:

Size	Coppice colliery machine-cut hand-filled face	Selston colliery A.B. Meco-Moore cutter-loader face with 5 ft. 6 in. loader
Plus 3 in.	34.6 p.c.	30.5 p.c.
— 3 to 2 in.	9.0	8.6
— 2 to 1 in.	15.3	16.8
— 1 to $\frac{1}{2}$ in.	12.7	13.7
— $\frac{1}{2}$ in.	28.4	30.4
Proceeds from 100 tons	£315 0s. 9d.	£310 15s. 8d.
Average selling price	63s. 0.1d.	62s. 1.9d.

Grading tests comparing work with the Meco-Moore and hand-loading in two different parts of the country are also given by Hayes¹⁴.

	Before installation of Meco-Moore %	After installation of Meco-Moore %
Plus 2 $\frac{1}{2}$ in.	25.00	19.72
2 $\frac{1}{2}$ — 1 $\frac{1}{2}$ in.	11.57	10.26
1 $\frac{1}{2}$ — $\frac{3}{4}$ in.	11.56	9.02
$\frac{3}{4}$ — $\frac{1}{2}$ in.	12.59	12.36
$\frac{1}{2}$ — $\frac{1}{4}$ in.	1.31	2.67
$\frac{1}{4}$ — $\frac{1}{8}$ in.	7.89	10.07
$\frac{1}{8}$ — $\frac{1}{16}$ in.	9.35	9.63
$\frac{1}{16}$ — 30 B.S.S.	10.79	12.08
30 — 60 B.S.S.	4.25	5.39
60 — 100 B.S.S.	2.49	2.89
100 — O. B.S.S.	3.21	5.91
Plus 8 in.	14.9	14.2
8 × 4 in.	18.0	15.7
4 × 2 $\frac{1}{2}$ in.	10.2	7.6
2 $\frac{1}{2}$ × 1 $\frac{1}{2}$ in.	12.3	9.2
1 $\frac{1}{2}$ × 1 in.	5.5	7.4
1 × $\frac{1}{2}$ in.	15.3	15.9
$\frac{1}{2}$ in × $\frac{1}{4}$ m.m.	19.4	24.2
Minus $\frac{1}{8}$ in.	4.4	5.8

The cost per ton and comparative performance of the cutter loader relative to conventional hand loading when working on the 140's unit at Gedling Colliery is given by Round and Scott¹².

	Hand loaded	A.B. Meco-Moore
Average working section	3 ft. 7 in.	4 ft. 5 in.
Section of clean coal	3 ft. 4 in.	4 ft. 1 $\frac{1}{2}$ in.
Face length	166 yards	164 yards
Average daily tonnage	237	279
Saleable cwt/manshift	81.6	100.7
Tons produced/yard of face/ 24 hrs.	1.43	1.70
Face labour cost	14s. 4.7d.	11s. 10.4d.
Face materials cost —		
Timber	1s. 4.5d.	9.4d.
Steel	11.1d.	3.2d.
Explosives	5.2d.	3.7d.
Other	4.0d.	7.1d.
Cost per ton	3s. 0.8d.	1s. 11.4d.
Period of comparison	8 weeks	8 weeks

at 10 in. of conny coal left to form a roof

The growing use of the machine is shown by Hayes¹⁴ in a table covering the years 1947-1953.

Growing use of A.B. Meco-Moore cutter loader

	1947	1948	1949	1950	1951	1952	1953
Number in use	25	45	61	81	81	112	117
Tonnage loaded	2,159	3,007	3,586	4,389	5,225	6,328	7,252
Face O.M.S. tons	N.A.	7.01	6.71	6.42	6.44	6.09	6.03

REFERENCES

- Sidall, N. and Thorpe, R. H. Continuous Mining with the A.B. Longwall Trepanner. *Iron and Coal Trades Review*. April 1955.
- Round, C. and Scott, R. Anderton Shearer Loader. Experience at Gedling Colliery. *Iron and Coal Trades Review*. September 1955.
- Hayes, J. A. The A.B. Meco-Moore Simultaneous Cutter Loader. Centenary Congress of the Société de l'Industrie Minière. June 1955.

Machinery and Equipment

Public Works Exhibition and Congress, 1956

A considerable number of new products will be introduced at the Public Works and Municipal Services Exhibition and Congress opening at Olympia, London, on Monday, November 12.

The trend in much of the contractors' equipment to be shown is towards larger and more powerful machines. Many of the leading manufacturers, however, have concentrated on improving the design, reliability and general performance of their established models.

The size and scope of the Exhibition is bigger than ever. For the first time since it was inaugurated in 1919, the entire available space at Olympia will be occupied by 366 stands (275 in 1954).

In the nine sessions of the Congress, the papers presented will cover an unusually wide field of interest.

Her Majesty the Queen is Patron, and the Exhibition and Congress will be officially opened by the Rt. Hon. Duncan Sandys, M.P., Minister of Housing and Local Government, at 2.30 p.m. on November 12.

In the Empire Hall, Ground Floor, on Stand No. 162/164, a new product, the Cobra motor drill, will be introduced by Atlas Copco (Great Britain) Ltd. This machine, which can drill to a depth of 13 ft., weighs only 53 lb. and is claimed to be the lightest motor drill on world markets.

The petrol motor is a conventional 1 cyl. two-stroke motor with loop scavenging system, fitted with air filter, fuel tank, ignition by means of a flywheel magnet, cooling fan, floatless carburettor, and an enclosed starter with pull wire and return spring. The Cobra is 24 in. overall length, drills at a net

rate of 6½ in./min. at 75-100 ft. per Imp. gal.

Ford Motor Company Ltd. will exhibit on Stand 64 which will be divided into two parts by cantilever styling so that the products of two organisations—Dagenham's Tractor and Parts Divisions—will be kept separate in the public mind. On one side will be an industrial Fordson Major tractor fitted with vacuum braking, automatic pick-up hitch and Leeford Muledozer, together with an activated Major Industrial Equipment unit; and on the other, four industrial petrol, and two diesel engines—one a low-speed type mounted on a display device which moves it through three planes.

The obvious relationship of the Major Industrial Equipment Unit with the low-speed diesel engine, exhibited on the other half of the stand, makes it imperative that an explanation be given as to why this distinction is made. This is no artificial separation brought about by internal reorganization; it is the response to demand from two different markets.

On Stand 137, Portcullis Avenue, Robert Broadbent and Son Ltd. will show a 36 in. by 9 in. roller bearing granulator fitted with Skefko roller bearings, and manganese steel jaws and cheeks. The machine is used for the production of fine chippings. Other exhibits on the stand of these manufacturers will include 36 in. diameter by 24 in. wide high-speed crushing rolls, fitted with manganese steel-toothed shells. They are driven by two motors, one for each roll, with V-rope drives. Renewable sleeves are fitted to each roll shaft. These never need replacement, therefore, as all wear is taken by the gunmetal bearings and steel sleeves.

On Stand 3, Grand Hall, Hubert H. P. Trist and Co. Ltd. will display Topdog brake and clutch liners for excavators,

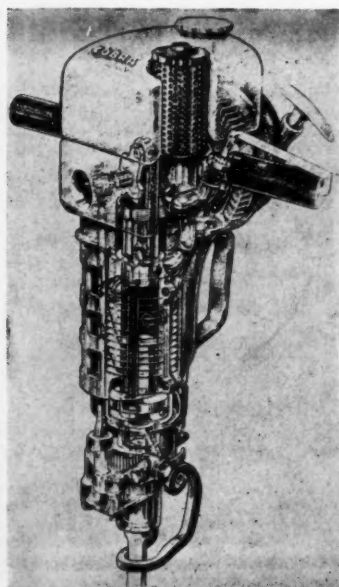
trenching machines, tractors, concrete mixers, compressors and ropeways.

On Stand 123, National Hall, Jack Olding and Co. Ltd. will show a pre-production model of the new Vickers Vikon tractor, as well as Vickers Vigor tractors and matched equipment, together with Onions earthmoving equipment, Hendrix dragline buckets and a Wakefield 603 motor grader.

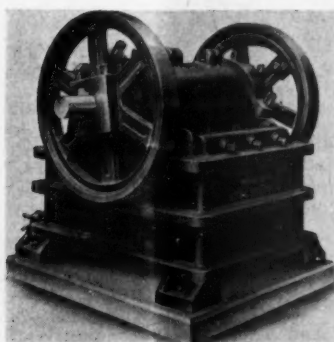
Jack Olding and Co. Ltd. will exhibit several items of equipment for contractors having to carry out limited earthmoving operations on building sites, quarries and road construction. These will include the Onions model 4-6 scraper and the Onions SR ripper, both designed for tractors having a drawbar pull of 10,000 lb. and over, also suitable Onions cable control units for operating these equipments.

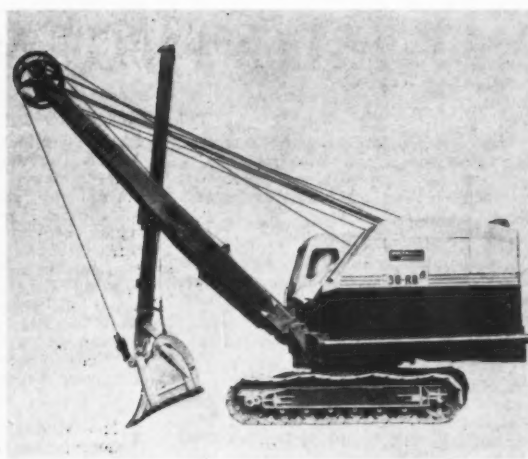
On Stand 4, Grand Hall, Hunting Aerosurveys Ltd. will demonstrate the scope and applications of aerial survey to the needs of the civil and constructional engineer and the contractor.

On Stand 30, Grand Hall, Pegson Ltd. will this year be exhibiting several machines which have not previously appeared on any exhibition stand in this country. They have recently extended their range of jaw crushers and will be showing the 30 in. x 42 in. single toggle roller bearing crusher with a fabricated steel body. This, it is believed, is the largest machine of this type to be manufactured in Great Britain up to the present. Another new machine will be the 48 in. x 36 in. double toggle plain bearing crusher with a fabricated sectional body. This machine also has a number of interesting features which will appeal to quarry owners. The manufacturers will also be exhibiting an example from the range of Klocknar Humboldt Resonance Screens which they will shortly be manufacturing in the U.K. Also exhibited will be one



The Cobra motor drill, seen at left, is to be exhibited by Atlas Copco (Great Britain) Ltd., at the Exhibition, as is the roller bearing 36 in. by 9 in. granulator, manufactured by Robert Broadbent and Son Ltd., and the Vickers Vikon tractor, distributed by Jack Olding and Co. Ltd. The Broadbent granulator, below centre, is fabricated from solid cast steel with main frame and roller bearings, while a pre-production Vickers Vikon is seen, below right, equipped with Onions 8-11 open bowl scraper





At top left is shown a drilling demonstration at which the Holman Silver Three and Dryductor (foreground) drills revealed their paces. Top right is the Ruston-Bucyrus 30-RB excavator, and below right is the Hemborn Dust Extractor, exhibited by the Consolidated Pneumatic Tool Co. Ltd.

of the latest additions to the Pegson Telsmith Gyrasphere range, i.e. the 36 in. machine with a 7 in. wide feed opening.

Holman Bros. Ltd., are again occupying their usual stand—No. 21, Grand Hall—with a representative selection of pneumatic plant.

The stationary compressors to be exhibited are the smallest and the largest of the range—ATH8S and T60R—with maximum outputs of 68 and 535 cu. ft./min. F.A.D. at 100 lb./sq. in. Portable compressors are also represented by two models—TA13D (126 cu. ft./min. F.A.D.) air cooled, driven by a Fordson engine; T25D (215 cu. ft./min. F.A.D.) an old favourite brought up-to-date, driven by a Dorman engine. In addition there are the Holman Tractair 13 and Holpack 13.

Holman Handrills are to be represented by machines ranging from the light-weight Silver Eight to the latest general purpose Silver Thirty. The record-breaking Silver Three is to be shown on an airleg and also cradle—mounted on one boom of a twin-boom, light version of the hydraulic drillrig. The Dryductor drill will be shown on airleg, on hydraulic drillrig and on stoperleg. Holbits and Holsteels in their latest form are to be displayed.

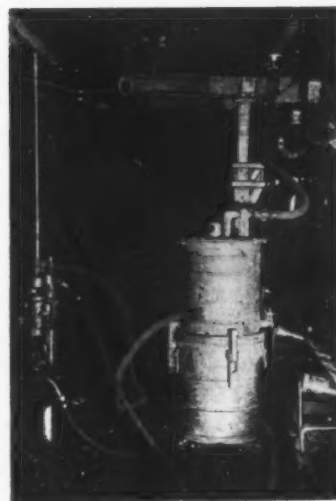
On Stand 74, Grand Hall, Ruston-Bucyrus Ltd., will introduce a new caterpillar-mounted excavator of 1 cu. yd. capacity with full air control. This machine will be fitted with a shovel equipment of the positive twin-rope crowd type successfully employed on other machines in the range. Other equipments available for this machine are dragline, dragshovel, grabbing crane or lifting crane, the latter with booms up to 100 ft. in length. The power unit of the machine is a Ruston 5 YFN diesel engine developing 96.8 h.p. at 1,200 r.p.m. The shovel boom length is 20 ft.; dipper handle length 17 ft.; overall length of the caterpillar mounting 13 ft. 1 in.; width of links 30 in. Weight of the machine in working order 60,300 lb.

On Stand No. 59, Grand Hall Annexe, The Consolidated Pneumatic Tool Co. Ltd., will exhibit Power Vane portable air compressors, the complete range being exhibited for the first time in sizes from 40 to 600 cu. ft. In the group of rock drills, both wet and dry machines, several models will be featured, from light hand held sinkers to heavy duty feedleg mounted drills, and the exhibit will embrace the latest type of CP-Hemborn dustless dry drilling equipment. Special equipment is being shown for the interest of visitors considering the new technique of roof bolting on tunnel driving contracts.

On Stand 67, Grand Hall, Mackay Industrial Equipment Ltd. will display the Allis-Chalmers TL-12D Tractor-Loader and other units. With the power and lift of a crawler tractor mounted loading shovel, the new Allis-Chalmers Tractomotive Tractor-Loader Model TL-12D combines the handiness and speed of a rubber-tired tractor. Another machine, the Allis-Chalmers HD.21 weighs 44,000 lb. and is one of the largest and most powerful crawler tractors in production.

Other units on display will be the HD6G, the Fiat 60CI, and Merton equipments. The Mackay DAC.130 air compressor is also to be shown.

On Stand 6, Grand Hall, British Ropes Ltd. will be demonstrating the instruments and methods by which its advisory and technical service department ensures maximum rope life, by ascertaining the correct rope for any particular application. The point of emphasis is that through the recommendations and field reports of this department, the benefits of the company's extensive research on rope life and service are passed on to the user. Items on view will include the micro-tensiometer and the micro-strain gauge—both of which are used to record rope tensions. Other apparatus records vertical stresses, vibrations and other factors of rope wear and fatigue. High-tensile steel wire for the manufacture of pre-stressed concrete will also be on view.



together with hard, soft and synthetic fibre ropes and cords of all types.

J. and H. McLaren Ltd. will feature Petter-McLaren air-cooled diesel engines on the Brush Group stand, No. 161, Grand Hall. Also on show will be one of the latest engines to be added to the Petter-McLaren watercooled range, the LE6, incorporated in a 100 kW alternator set.

The National Gas and Oil Engine Co. Ltd., on the same stand will exhibit the M4AA6 vertical six-cylinder diesel engine developing 198 b.h.p. at 1,200 r.p.m.

Mirrlees, Bickerton and Day Ltd., Stockport, will be exhibiting an engine model and sectioned components on the Brush Group stand, and Petters Ltd. will exhibit industrial engines representing their petrol, vapourising oil and diesel oil ranges.

On Stand No. 91, Grand Hall, Armstrong Whitworth (Metal Industries), Ltd., will show a No. 70 Kue-Ken jaw crusher, the most powerful and economical for its size and weight available. With an all up weight of only 15,000 lb. its rated capacity is approximately 89 tons per hour at a 4 in. jaw setting. The feed opening is 30 x 15 in. and is designed to accept a maximum recommended feed of 12 in.

MINING MISCELLANY

The Turkish Ministry of Commerce has authorized exporters of minerals to use part of their earnings in foreign currencies to buy equipment and spares for their mines.

★

Considerable deposits of uranium ores have been found in Finnmark, Norway, but it is not known whether they can be economically exploited.

★

Construction of the main dam wall at the Kariba Gorge was launched at a formal ceremony on November 6, when Viscount Malvern placed the first cubic yard of concrete. By the middle of 1960 about 3,000,000 tons of concrete will have been used to create a wall 400 feet high.

★

In an effort to keep pace with expanding output Steep Rock Iron Mines, of Canada, has placed orders for three "Koepe" hoists, each capable of lifting 22 tons of ore from 2,000 ft. Each hoisting unit is powered by two 1,250 h.p. motors and involves an expenditure of about \$250,000.

★

A large quantity of pyrites is reported to be available for sale at the St. Patrick Copper Mines in Avoca, a subsidiary of the Mogul Mining Corporation of Toronto. Farmers' organizations in the country have been urging domestic fertilizer manufacturers to buy the pyrites in preference to imported material, which is at present quoted at about 8s. per cwt.

★

A rich alluvial gold deposit has been discovered in the U.K. Situated in Sutherlandshire, it covers a wide area and is reported to be panning over 2 dwt. per ton. We understand that an active partner is required for its development, to start in March or April. Certain restrictions prevent the deposit from being worked on a large scale, but it is considered that with "Niagara" screens and a classifier specially designed by the prospector, a good profit can be made by two partners working a few hours per day.

★

On his return to Peking Mr. Yap Pheng Geck, secretary of the recent Singapore trade mission to Peking, stated that China was interested in buying a variety of goods and commodities from Britain, among which he instanced tin ore and tin plates. He said that members of his mission and businessmen from Malaya had concluded more than 10,000,000 Malayan dollars' worth of contracts with Chinese trade organizations in Shanghai and Canton, these being additional to 40,000,000 dollars' worth of transactions concluded in Peking.

★

At the annual meeting of Giant Yellowknife Gold Mines in Montreal,

the vice-president and managing director, Mr. A. J. Anderson, told shareholders that a new line of research offered encouraging prospects of solving the metallurgical problems of obtaining a higher recovery of gold from the mine's refractory ore. It involves the application of a higher temperature to the roasting of the calcine tailings, which run about one ounce of gold. Preliminary work indicates a recovery of up to 70 per cent in this phase, raising the overall recovery to between 85 and 87 per cent. Last year recovery averaged 79 per cent.

★

The Minas el Peru at El Callao in Venezuela was owned originally by New Gold Fields of Venezuela. The contract for its complete equipment was placed in 1929 with the Fraser and Chalmers Engineering Works of the G.E.C. Later the works were eventually abandoned and lay derelict for two years. In 1952, however, the mines were taken over by the Corporation Somento and work was restarted. In spite of its long exposure to tropical conditions without maintenance it was found possible to use some 70 per cent of the original equipment including that of the Pirelli General Power cables of the G. E. C. switch gear and transformers and many of the machines. Many spares were made on site. Some of the original drawings of 1927 and 1929 were obtained from the Fraser and Chalmers Engineering Works

although others had been destroyed in the blitz. The mine has an output of some 160 kilograms gold per month.

★

The Greek Government has permitted a U.S. firm to remit \$150,000 under the investment law for the overhaul and re-opening of the iron mines at Atalanti on the west coast. The mines belong to the Bank of Chios and have been out of use since 1938 when the production was about 80,000 tons. Another U.S. firm was given permission in September to remit an initial sum of \$100,000 for the exploitation of manganese on the island of Thasos, and a Belgian firm has been permitted to import \$197,000 for a similar purpose at Styra in Euboea. A contract between a U.S. company and the Greek Government for the exploitation of asbestos deposits at Kozani has been signed.

★

The New Consolidated Goldfields have applied to the Southern Rhodesian Government for an exclusive prospecting order, so that they can search for coal in an area near the Limpopo River. The application, which appears in the latest Government Gazette, concerns an area of about 100 sq. miles between the Bulye and Limpopo rivers and near the confluence. The company wishes to search for and mine coal, mineral oils and natural gases. There are known coal



An electrical drive at El Callao

deposits in the area but they have not been properly explored. The area has been provisionally reserved against prospecting and pegging.

Mr. Aubrey Jones, Minister of Fuel and Power, stated in the House of Commons that, so far as could be foreseen, production of opencast coal would have to be maintained at a high level for at least 10 years. The Government had accordingly decided to make extra-statutory improvements in the compensation paid to the owners and occupiers of requisitioned agricultural land. The extra-statutory supplementary rental compensation, now at the same rate as the statutory rental compensation (or twice that rate in the case of certain small holdings) will be increased to three times that rate (or four times in the case of the small holdings). The rehabilitation allowance, which is paid in some cases to landowners at the time of de-requisition to cover loss of full beneficial use of the agricultural land, will, in future, be paid in all cases at a flat rate of one year's rental compensation. In special cases it may be increased to a sum not exceeding two years' rental compensation.

In a new handbook analysing Turkey's investment potentials for U.S. businessmen, the Bureau of Foreign Commerce, U.S. Department of Commerce, points out that, although much of the country's wealth remains to be developed, Turkish wolfram reserves are among the largest in the free world, and the country is already one of the major producers of chrome. Manganese, copper, bituminous coal, sulphur, lead, iron and salt are being produced, and pilot operations are under way in the production of magnesite, antimony, boracite, asbestos, mercury and emery.

Copper production in the Belgian Congo in the first six months of 1956 amounted to 129,244 tons as compared with 121,537 tons in the same period in 1955. Output of raw zinc concentrates amounted to 99,293 tons while that of grinded zinc concentrate was practically unchanged at 55,226 tons. Granulated cobalt production declined slightly to 2,026 tons from 2,685 tons while cassiterite production dropped from 8,259 tons to 7,954 tons. Foundry tin also declined slightly from 1,664 tons to 1,267 tons. Manganese ore production remained unchanged at 178,702 tons while gold production declined slightly to 5,745 kilos. Tantalum columbium output dropped from 243 to 181 tons. On the other hand output of wolframite increased to 216 tons from 143 tons in the first six months of 1955 and beryllium production amounted to 733 tons.

PERSONAL

J. B. Richardson has been appointed to represent the Combined Development Agency and the U.K. Atomic Energy Authority in Australia and will be based on Sydney.

Lord Bridgeman, chairman of Atlas Copco (Great Britain) Ltd. has left London for a month's tour of South Africa and the Rhodesias. He will visit Delfos and Atlas Copco (Pty.) Ltd. in South Africa and the two Atlas Copco companies in Ndola and Salisbury.

Mr. A. A. Lough has been appointed to the board of the Natal Navigation Collieries and Estate Co.

Mr. C. B. White has left the board of the North Charterland Exploration Co (1937).

Mr. M. B. Henderson, who has been technical manager for the past six years, has been elected to the board of the Universal Asbestos Manufacturing Co. Ltd. Major General Sir John Sinclair, K.C.M.G., C.B., O.B.E., has been elected to the board of the same company.

Mr. R. B. Long has been appointed Export Sales Manager of the Chaseside Engineering Co. Ltd.

Owing to ill-health, Mr. J. R. Arundale has retired from the office of secretary of Simon-Carves Ltd. Mr. R. S. Helliwell, the company's accountant, has been appointed secretary in his place.

Mr. James B. Longmuir, who has represented Megator Pumps and Compressors Ltd. in Scotland for the past six years, has been appointed to the newly-created post of Scottish Regional Manager. His son, Mr. James B. Longmuir, junior, was appointed in June as an additional Scottish technical representative to cope with the rapidly expanding business in Scotland.

The second ordinary general meeting of the Institution of Mining and Metallurgy for the Session 1956-57 will be held in the apartments of the Geological Society, Burlington House, Piccadilly, London, W.1, at 5 p.m. on Thursday, November 15. The papers submitted for discussion will be "A new process for pneumatic stowing; its development and introduction at the Rio Tinto Mines, Spain," by Mr. Edward Rich, and "Some developments in tailing disposal at Roan Antelope Copper Mines, Northern Rhodesia," by Mr. M. R. Goldick. The two papers were published respectively in the September, 1956, issue of the Institution's *Bulletin*, pp. 517-556, and the August, 1956, issue, pp. 499-502.

A list of the 201 papers to be discussed at the Second International Congress of Surface Activity, to be held in London from April 8 to 12, 1957, has now been published. The President of Honour is the Rt. Hon. the Lord Brabazon of Tara, P.C. Sir Eric Rideal is president of the Congress and Dr. L. H. Lampitt chairman of the organizing committee. Enquiries should be addressed to the hon. secretary, Lieut.-Colonel Francis J. Griffin, 14 Belgrave Square, London, S.W.1. Telephone, Belgravia 3681.

The fourth Salon de la Chimie Caoutchouc Matières Plastiques will take place in Paris from November 22 to December 3. A display entitled "The nuclear materials" will be presented by Le Commissariat à l'Energie Atomique. Uranium, thorium and plutonium will be featured in the section relating to fuels. The exhibit will include diagrams of new plants for the chemical concentration of uranium minerals, as well as a flowsheet depicting the production of metallic

uranium from French sources. Heavy water and graphite used in France's atomic reactors will also be shown, as well as beryllium and oxide produced in France to a remarkably high degree of purity.

The Ballast, Sand and Allied Trades Association, representing some 500 gravel-pit owners throughout the U.K., has changed its title to the Sand and Gravel Association of Great Britain.

We have received from the Aluminium Development Association, 33 Grosvenor Street, London, W.1, the latest edition of the A.D.A. Directory of Members covering the period 1955-56 and a revised booklet giving details of the main series of technical publications issued by the Association.

The Committee on Reactor Materials of the Atomic Industrial Forum has announced a concentrated two-week course on reactor materials to be held at New York University from November 26 to December 7.

A one-day conference on automation, education and training will be held at the Royal Festival Hall, London, on December 4, 1956.

On and after November 15, 1956, the address of Wm. Shyvers Ltd. will be Baltic Exchange Chambers, 14-20 St. Mary Axe, London, E.C.3. The telephone number is Avenue 6611/6 and the Inter. Telex No. London 8201.

The National Council for Technological Awards now has its own premises at 9 Cavendish Square, London, W.1. Telephone, Museum 1978.

CONTRACTS AND TENDERS

The following future authorizations have been announced by the International Co-operation Administration (I.C.A.):

Taiwan (Formosa)

PIO/C No. 84-22-301-9-60430 covers a variety of commodities which include non-metallic minerals and non-metallic mineral products. (\$U.S.36,000); iron and steel mill materials, steel mill products and ferro-alloys (\$141,200); aluminium, aluminium base alloys and aluminium products (\$120,000). The contract period is from 12/9/56 to 30/3/57 and the terminal delivery date 30/6/57. B.O.T. Ref.: E.S.B. 27499/56/ I.C.A. Telephone enquiries to Chancery 4411, extension 360.

British Insulated Callenders Cables has been awarded a contract worth £200,000 in connection with the Kariba hydro-electric power scheme. The contract is for the manufacture, supply, testing, completion and commissioning of 330 kv., 11 kv. and auxiliary cables connecting main transformers in the underground power station to the switchyard.

The final contract has been signed between the Government of India and the Indian Steelworks Construction Company (Iscon) for the construction of an integrated iron and steel plant at Durgapur, in West Bengal. Iscon is a consortium of leading British firms.

Metals and Minerals

Australia's Bauxite and Atomic Power

Further information has been received from our Australian Correspondent regarding the discovery of bauxite by Zinc Corporation Ltd. on the west coast of Cape York. This find promises to be one of great importance and, apart from the bauxite aspect, will give a stimulus to prospecting in that little known part of Australia. A subsidiary of Zinc Corporation, Australian Mining and Smelting Co. Ltd., has been granted authority to prospect over an area of 1,450 sq. miles. The occurrence, along the Gulf of Carpentaria, is exposed as a low cliff; its actual area apparently extends beyond that held by Australian Mining and Smelting, for other companies have taken an interest in the search for bauxite in the locality. One is Aluminium Laboratories Ltd. of Canada, and another is Reynolds Metal Corporation, of U.S.A.

By the end of the year it is expected that the Zinc Corporation interests will have sufficient data from the test work in progress, to assess the grade of the material. If this is above the commercial level, it is believed that the Cape York bauxite occurrence will be in the class of the world's largest. This will be a factor of great importance in the Australian bauxite and aluminium industry, for at present ore for the works of the Australian Aluminium Commission at Bell Bay, Tasmania, is imported from Malaya, since the grade of the extensive known local deposits is lower than is desired.

It might be suggested, as an interesting subject for speculation, that the Cape York bauxite occurrence, situated as it is in a remote and doubtless rather inaccessible region, seems to present a favourable opportunity for aluminium reduction on the spot thereby avoiding the difficulties associated with the transportation of ore to a reduction works elsewhere. In this connection attention might be drawn to the recent statement by Mr. E. P. Hawthorne, chief executive of the Hawker Siddeley Nuclear Power Company, that applications on the lines of research on which this company is now engaged would include the production of atomic power plants for remote areas, such as might be required in the mining industry. This, of course, is still in the future, but at the present pace of atomic development it may not be long before suitable units for mining and metal reduction become available.

HIGHER WOLFRAM PRICES

In our previous issue we suggested that the crisis in the Middle East might result in an upward movement of wolfram prices. This prediction has been fulfilled, for the emergency has induced a considerable amount of buying interest. The dawn of November brought the first upward movement in prices since they started to fall in April last, dealers adjusting their ideas to a range of around 222/6 to 227/6 per 1-ton unit c.i.f. Europe for minimum 65 per cent material against 220s. to 225s. previously.

For some time past buyers have allowed their stocks to run down while prices were declining. Now much more buying interest is reported on both U.K. and Continental account. By November 6 prices had advanced to a range of 225s. to 230s., and it is understood that business to the Continent has been arranged at prices approaching the higher figure. It is felt that a better demand for ferro-tungsten will develop as a result of the steadier tone in wolfram ore.

REFINING CANADIAN NICKEL

Our Canadian correspondent writes that small prospective producers of nickel are about to be provided with the means by which they may circumvent the bottle neck which has heretofore existed in nickel refining facilities in this country. In the past, new producers without refining facilities of their own were obliged to funnel their output through International Nickel Co. of Canada and Falconbridge Nickel Mines. Now comes the announcement that Sherritt-Gordon Mines, with its plant in Saskatchewan, is in a position to accept nickel refining business on a toll basis—to the extent of 3,000,000 to 4,000,000 lb. of nickel annually. Added to this is the new nickel refinery which Eastern Mining and Smelting, together with Mogul Mining Corp., are building at Chicoutimi in Quebec.

Negotiations are in progress between International Nickel Co. of Canada and the government of the province of Manitoba in connection with plans for development of the mining project at Moak Lake and Mystery Lake in the northern part of Manitoba where an exploration shaft was completed last year to a depth of 1,325 ft. Provided a satisfactory agreement is reached, the new undertaking would involve expenditure of some \$160,000,000. The outlook is that should Inco decide to proceed with the development, the Manitoba government would in turn proceed with the construction of a hydro-electric power plant on the Nelson River to the east of Moak Lake.

ZIRCONIUM FROM SCRAP

The Bureau of Mines, U.S. Department of the Interior, has started work on a \$110,000 research project, financed by the Atomic Energy Commission, to develop a method for recovering zirconium from impure sponge metal, mill scrap and zirconium alloys. At present only a small part of the impure sponge frequently obtained in making zirconium, and the scrap produced in fabricating and machining it can be recycled to make reactor-grade material. This is because impurities in the sponge and scrap lower the quality of the metal made from it. It is believed that the problem can be overcome by electro-refining and this possibility will be investigated by the Bureau at its experimental station at Boulder City, Nevada.

The development of a commercially feasible electro-refining process would make zirconium metal available for use in building atomic reactors. By recovering material now lost in producing, fabricating and machining zirconium, it would help to lower the metal's price and pave the way for use in other fields.

A 100 per cent advance in zirconium production has been announced by Allegheny Ludlum Steel Corporation. The company has completed a new furnace—believed to be the largest of its type in the world for melting high purity zirconium—at its Watervliet, New York, plant. The furnace can produce a 2,200 lb. ingot and has a rated capacity of 25 s.tons per month. A second and larger zirconium furnace, under construction, will be in operation before the end of the year.

U.S. COBALT SUPPLIES

A Defence Production Act contract was negotiated for 9,000 s.tons of cobalt from the Belgian Congo for delivery over a three-year period, states the U.S. Office of Defence Mobilization in its report for January-June, 1956. It was further announced that exploration based on geological mapping and geochemical sampling had revealed new cobalt-copper ore deposits in Idaho that might constitute a major increase in known cobalt reserves.

The Cobalt Information Centre at Battelle Institute has announced publication of its new reference bibliography, "Cobalt and its Alloys, a Summary on Allotropy and Phase Diagrams". This 100-page bibliography is available to persons who write directly to the Cobalt Information Centre, Battelle Institute, Columbus, Ohio, U.S.A.

MANGANESE ORE PRICES

Strengthening resistance from buyers of manganese ore, coupled with the Indian export duties and the recent increases in freights, make it impossible to comment with any degree of assurance on the market outlook at the present.

COLUMBIUM IN CANADA

Cons. Mining and Smelting Co., in association with Power Corp. of Canada, has entered into the financing and the development of Beauceage Mines. The property is located on an island in Lake Nipissing in Northern Ontario, a few miles offshore from the city of North Bay. Preliminary diamond drilling, together with considerable underground development has suggested the likelihood of ore measured in millions of tons. The ore carries columbium, tantalum and uranium on which a pilot plant of 50 tons daily capacity is already carrying out tests.

COPPER • TIN • LEAD • ZINC

RUSSIA MAY DETERMINE COPPER TREND

Copper has been subjected to rapidly changing influences in the past week. The outbreak of hostilities between Egypt and Israel touched off an upward movement to which the intervention of Britain and France gave an added impetus. Later, prices (in the United States this means scrap prices) began to fluctuate as different assessments of the news were made and the prospects opened of both a much wider conflict and of a rapid settlement arranged by the United Nations. In the event the United Nations appears to have arranged a cease-fire but the situation on the armistice lines is obscure and the possibility of a resumption of hostilities remains.

These events have not had the same market consequences in Britain as in the United States. In Britain the price of copper has risen pretty well proportionately with the seriousness of the news, and the question that operators have had to ask themselves is to what extent will the crisis interfere with normal shipping? With the Suez Canal closed—possibly for months—shipping will be short and commodities, even those like copper, which do not normally pass through the Canal on their way from primary producer to consumer, will be seriously affected. In the United States, on the other hand, the consequences are quite different. It is true that the outbreak of hostilities induced the custom smelters to raise their price to the level of the big producers—36 c. per lb.—but this was not an uncongenial move for them if copper could be sold at that figure. Also custom smelters must now be expected to see how far the big producers will go in their production cuts to protect the figure of 36 c. However, the important consequence was to shake the belief in a recovery in Detroit and elsewhere. Americans are far more worried by the poorness of brass demand than by any threat to physical copper supplies; and wars are not good for business.

On the other hand, the result of the American election will no doubt contribute greatly to confidence; both because the Democratic programme was hopelessly inflationary and because everybody in the United States believes that Ike can keep them out of a war. Copper producers thus have a straw to clutch at.

Meanwhile events in Europe as well as causing a flurry of buying by Continental consumers may have more far-reaching consequences. It is too early to see how things in Hungary and Poland will settle down. But two facts have to be borne in mind. The first is that there is already a demand for economic sanctions against Russia. Nobody could say whether these will be instituted or whether they could be made effective. But Russia has been a significant buyer of copper in the last year and, on a falling market, a complete absence of Russian buying would be something to be reckoned with. The second fact is that the Russians and their satellites are committed to raising living standards in the pretty short term. If, therefore, they are permitted access to London for certain types of copper then they

may become avid buyers of it. There is a corollary to this; to buy they must sell and they will hardly be able to sell foodstuffs or timber of building qualities. Will there be more gold or tin on the market?

TIN FROM THE STOCKPILE?

Tin has naturally been much more affected than any other metal by the fighting in Egypt. Spot Straits metal has reached \$1.14 c. per lb. but is now back to \$1.10 in New York and the feature of the markets on both sides of the Atlantic has been the widening of the "back" as the prospect of a sharp squeeze in immediate supplies looms up. At the moment it is impossible to say for how long the Suez Canal is likely to be blocked; that depends on the number and nature of obstructions (particularly whether the sunken ships are filled with explosive), the facilities of the troops for removing them and the freedom they are allowed to get on with the job. Two months seems a fairly optimistic forecast. Meanwhile the Far Eastern Freight Conference has notified shippers of a surcharge of 15 per cent on the tariff base rate on all commodities for ships loading on or after November 8. This rate will presumably apply for as long as the canal is blocked. On October 30, 22 ocean-going ships were awaiting berths at Singapore as a result of the Singapore strikes. Thus the blocking of supplies had begun before the Canal was closed.

The possibility of a squeeze in supplies in the United States has given rise to the suggestion that the output of the Texas smelter should be placed on the market. The fact that rubber users are already making plans to obtain government rubber (as they have had on earlier occasions) lends support to the idea. It is certainly an unfortunate circumstance that the Tin Council has no metal for sale. If, therefore, pressure to release Texas output becomes very strong it might be a solution for the United States to loan metal to the Tin Council for subsequent repayment. There are difficulties on both sides in the way of such an arrangement; but what it is necessary to avoid is the possibility of creating a precedent for a situation in which two stocks of the metal are being used to regulate the market.

*

It is officially stated that two bids have been received for the Texas smelter. One is from the Wah Chang Corporation of New York and the other is made by a group of interested parties acting through agents. Negotiations are beginning immediately.

*

With effect November 1 the base box price of most tin mill products in the United States was raised by 10 per cent.

*

The new President of Bolivia, Herman Siles Zuazo, has warned the country of the threat of anarchy. He has ordered the re-organization of Corporacion Minera de Bolivia to increase output and cut costs.

LEAD LITTLE AFFECTED BY CRISIS

Lead was not heavily influenced in the United States by the turn of events in Egypt. The metal remained unchanged at 16 c. per lb. and at no time seemed likely to rise in sympathy with the movement in London. The market has, indeed, been exceptionally steady with good but unexciting booking of orders for November delivery. Consumption of lead in the first eight months of the year was 782,495 tons against 759,300 tons in the same period of 1955.

NO CHANGE IN ZINC

Zinc in the United States has derived virtually no support from the Middle Eastern crisis and is still quoted at 13.50 c. per lb. for prime western grade East St. Louis. There is said to be a good demand from galvanizers but not from the diecasters. The industry is still hoping for a good pick-up in activity in Detroit and the fact that a revival has not yet appeared is being attributed to teething troubles in getting the new models into full-scale production and not to any lack of interest in the new models themselves.

The London Metal Market

(By Our L.M.E. Correspondent)

The day to day, or one might almost say hour to hour, developments in the situation in the Middle East remained the dominant factors affecting the market. Whilst the world's copper supplies do not normally flow in any great quantity through the Suez Canal, the fact remains that copper consumers have had to consider the maintenance of their future supplies bearing in mind all the dangers inherent in the present situation. Delays in shipment must also be taken into account because of ships being diverted round the Cape and a certain number being requisitioned. During the past week copper values have moved between a high of £303 and a low of £283 on Wednesday morning following the agreement to call a "cease fire" in the military operations. The U.S. custom smelters' quotation is now on the same level as that of the primary producers and the R.S.T. price still stands at £265 per ton c.i.f. U.K., electrolytic wirebar basis.

The re-routing of shipping away from the Suez Canal on top of the already precarious supply position has had a marked impact on tin prices. Consumers have naturally taken the necessary steps to assure their supplies, and as a result the backwordation has widened since the beginning of the Middle East crisis to as much as £55 a ton, and during the same time forward metal has been as high as £842 10s. compared with £785 previously. On Thursday morning the Eastern price was equivalent to £822 per ton c.i.f. Europe.

Lead and zinc show no special features and in the main follow the general price trend. A certain tonnage of both these metals normally passes through the Canal, and it would appear that any prolonged interruption in supplies must have the effect of increasing the demand on nearby metal, thereby widening the backwordation. Consumer demand remains routine, but in zinc there are indications that a certain amount of covering is still taking place against the barter transactions.

Closing prices and turnovers are given in the table overleaf.

LONDON METAL AND ORE PRICES, NOVEMBER 8, 1956

THE WEEK ON THE L.M.E.

	November 1		November 8	
	Buyers	Sellers	Buyers	Sellers
COPPER				
Cash	£296	£296½	£285½	£286
Three months	£296½	£297	£286½	£287
Settlement	£296½		£286	
Week's turnover	8,825 tons		7,525 tons	
LEAD				
Current + month	£117½	£117½	£118½	£118½
Three months	£116½	£117	£116½	£117
Week's turnover	4,650 tons		3,050 tons	
TIN				
Cash	£875	£876	£850	£855
Three months	£832½	£835	£812½	£815
Settlement	£876		£855	
Week's turnover	845 tons		750 tons	
ZINC				
Current + month	£99½	£99½	£100	£100½
Three months	£96½	£96½	£96½	£97
Week's turnover	4,450 tons		3,875 tons	

METAL PRICES

Aluminium, 99.5%, £198 10s. per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 12s. Od. lb.
Cerium (99% net), £13 18s. lb. delivered U.K.
Chromium, 7s. 1d. lb.
Cobalt, 21s. lb.
Copper, £286 0s. per ton

ORES AND OXIDES

Bismuth	65% 8s. 6d. lb. a.i.f.
.. .. .	40% 6s. 3d. lb. a.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semifriable) 48%	£16 15s. Od. per ton c.i.f.
.. Hard Lumpy (45%)	£16 15s. Od. per ton c.i.f.
.. Refractory 40%	£10 15s. Od. per ton c.i.f.
.. Smalls 42%	£13 15s. Od. per ton c.i.f.
Baluchistan	£17 5s. Od. per ton c.i.f.
Columbite, 65% combined oxides, high grade	190s./205s. per unit
Lithium Ore—	
Petalite min. 34% Li ₂ O	£8-£10 per ton f.o.b. Beira
Lepidolite min. 34% Li ₂ O	£8-£10 per ton f.o.b. Beira
Amblygonite basis 7% Li ₂ O	£35-£40 per ton f.o.b. Beira
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	£21 0s./£22 0s. d/d
Molybdenite (85% basis)	8s. 5d. nom. per lb. (f.o.b.)
Titanium Ore—	
Rutile 95/97% TiO ₂	£102 per ton c.i.f. Aust'n
Ilmenite 52/54% TiO ₂	£11 per ton c.i.f. Malayn
Wolfram and Scheelite (65%)	225s./230s. per unit c.i.f.
Manganese Ore Indian	
Europe (46%-48%) basis 125s. freight	137d. nom. per unit c.i.f.
Manganese Ore (43%-45%)	115d. nom. per unit c.i.f.
Manganese Ore (38%-40%)	110d. nom. per unit
	(including duty)
Vanadium—	
Fused oxide 90-95% V ₂ O ₅	£12½-£13½ per unit c.i.f.
Zircon Sand (Australian) (63-66% ZrO ₂)	£20 per ton c.i.f.
Zirconium Oxide—Calcined Opacifier	£325 1-ton, delivered

Germanium, 99.99%, Ga.kilo lots 3s. 4d. per gram	Palladium, £8 0s./£8 10s. oz.
Gold, 251s. 7d.	Platinum U.K. and Empire Refined £34/£35 oz.
Iridium, £29/31 oz.	Imported £37 15s. nom.
Lanthanum (98/99%) 15s. per gram	Quicksilver, £83 10s. - £84 10s., ex-warehouse,
Lead, £118 10s. per ton	Rhodium, £42. oz.
Manganese Metal (96%-98%) £259/£265 according to quantity	Ruthenium, £15/£17 oz.
Magnesium, 2s. 4d. lb.	Selenium, 112s. nom. per lb.
Nickel, 99.5% (home trade) £519 per ton	Silver, 81½d. f.o.z. spot and 80½d.
Osmium, £24/27 oz. nom.	Tellurium, 15s./16s. lb.
Osmiridium, nom.	Tin, £855 per ton
	Zinc, £100 10s. per ton

LONDON STOCK EXCHANGE PRICES, NOVEMBER 7, 1956

Finance	Price Nov. 7	+ or - on week	Rand Gold contd.	Price Nov. 7	+ or - on week	Diamonds and Platinum	Price Nov. 7	+ or - on week	Tin (Nigerian and Miscellaneous) contd.	Price Nov. 7	+ or - on week
African & European	58½	-1/3	W. Rand Consolidated	28/9		Anglo American Inv.	9	-1/4	Gold & Base Metal	1/1½	
Anglo American Corp.	21/9	+1/4	Western Reefs	28/-	+7½d	Casta	26/4½	-6d	Jantar Nigeria	4/10½	+1½d
Anglo-French	26/3	-7½d				Cons. Diam. of S.W.A.	10/9	-3d	Jos Tin Area	13/9	
Anglo-Transvaal Consol.	26/3	-7½d	O.F.S. Gold			De Beers Defd. Regd.	5		Kaduna Prospectors	1/6	
Central Mining (£1 shrs.)	53/9	-1/9	Freddies	7/3	-3d	De Beers Pfd. Regd.	13½		Kaduna Syndicate	2/9	
Consolidated O'fields	58/-	+3d	Freddies Consolidated	3/9	-3d	Pots Platinum	13/9		London Tin	10/9	+4½d
Consol. Mines Selection	33½	-7½d	F.S. Geduld	79/4½	-7½d	Waterval	24/-		United Tin	1/-	
East Rand Consols	1/9	+1½d	Geoffries	5/10½	-9d						
General Mining	72/6	-1/3	Harmony	25½	+6d						
H. E. Prop.	8/6	+1½d	Lorraine	5/3	-6d	Copper			Silver, Lead, Zinc		
Johannes	41/6	+6d	Lydenburg Estates	14/6	-6d	Bancroft	48/-		Broken Hill South	66/6	
Rand Mines	65/7½	-7½d	Merriespruit	4/6	+4½d	Chartered	70/3	-1/9	Burma Mines	4/-	-1½d
Rand Selection	35/-	-1/4	Middle Wits	8/7½	-10½d	Esperanza	2/7½	-6d	Consol. Zinc	67/6	+1/3
Union Corporation	34/9	-1/4	Ofsets	52/9	-1/4	Messina	8½	-1/4	Lake George	15/3	+1½d
Vereniging Estates	4½	-3d	President Brand	56/3	+7½d	Nchanga	13½	-1/4	Mount Isa	26/3	
Wits	32/6	-3d	President Steyn	31/3	-4½d	Rhod. Anglo-American	5½	-1/4	New Broken Hill	50/3	
West Wits	33/6	-3d	St. Helena	26/6	-4½d	Rhod. Katanga	45/9	-2/3	North Broken Hill	103/-	-1/4
			Virginia Ord.	8/10½	+3d	Rhodesian Selection	45/9	-3d	Rhodesian Broken Hill	11/10½	+4½d
			Welkom	15/6	+1/4	Rhokana	39½	+1/4	San Francisco Mines	26/9	+3d
			Western Holdings	70/7½	+7½d	Rio Tinto	83/9	+1/3	Uruwira	4/4½	+1½d
						Roan Antelope	25/6				
						Selection Trust	4½	+1/4			
						Tanks	7½	-1/4			
						Tharsis Sulphur Br.	6½	-1/4			
									Miscellaneous		
									Base Metals and Coal		
									Amal. Collieries of S.A.	55/7½	+1/10½
									Associated Manganese	37/9	
									Cape Asbestos	10/3	
									C.P. Manganese	25/6	-3d
									Consol. Murchison	50/7½	-2/6
									Natal Navigation	62/6	
									Turner & Newall	100/4½	+10½d
									Wankie	15/9	
									Witbank Colliery	5½	
									Canadian Mines		
									Dome	£25½	
									Hollinger	£54	+2
									Hudson Bay Mining	£180	+5
									International Nickel	£204	+9½
									Mining Corp. of Canada	£4	+1
									Noranda	£117	+7
									Quemont	£94	+1
									Yukon	4/4½	
									Oil		
									Apex	42/-	
									Attack	32/9	-1/4
									British Petroleum	145/-	+8/9
									Burmah	90/-	+3/1½
									Canadian Eagle	67/-	-9d
									Mexican Eagle	24/-	+6d
									Shell	148/9	+4/4½
									T.P.D.	46/3	+1/9
									Ultramar	54/6	+3/4½

Mining Finance

Time and Tin Wait for no Man

Although brief and uncommittal, the recent statement on behalf of Osborne and Chappel and Tronoh-Malayan groups of tin companies that negotiations are in progress with a view to closer association both in the U.K. and in Malaya, carried nevertheless the first tangible evidence that opposition may be building up against the recent Camp Bird proposals to merge 18 Malayan tin companies.

When Camp Bird announced its original share exchange programme last September, it was widely suggested that some mining or other financial group might come forward with higher bids than those made. The attraction was certainly not lacking, for Camp Bird's original—and indeed subsequent—offers came so close to market quotations as to provide little inducement for acceptance. Indeed, the liquid asset positions of these companies might have been sufficient to draw potential bidders to a situation so dramatically spotlighted by Camp Bird. Yet, in the event, no one seemed interested, and a few of the individual companies expedited previously considered capital repayment plans rather than considering the question of amalgamation.

Whatever the Osborne and Chappel-Tronoh statements might mean, any attempt by the tin companies at closing their ranks against Camp Bird's attack could only be beneficial to tin shareholders. As the table below indicates there is not a great deal of time left before the bids expire. But all offers will, at length, probably be made unconditional, and in any case there is nothing to prevent Camp Bird acquiring shares through the open market.

Company	Exchange Offer*
Offer expired on October 31.	
Kinta	4 for 3
Offer expired on November 3.	
Kent (F.M.S.)	3 " 10
Rambutan	2 " 1
Tekka	1 " 2
Offer expires on November 14.	
Gopeng	5 " 6
Pengkalan Pref	4 " 3
Pengkalan Ord.	6 " 5
Chenderiang	4 " 3
Ipoh	2 " 1
Offer expires on November 21.	
Hong Kong	2 " 5
Killinghall	7 " 12
Kinta Kellas	1 " 2
Malaysium	1 " 12
Meru	1 " 18
Renong	1 " 1
Selayang	1 " 9
Sungei Kinta	4 " 3
Tanjong	5 " 3
Temoh	7 " 12

* First figure refers to Camp Bird shares.
N.B.—All offers expiring by November 14 have been made unconditional.

Naturally, the important question at the present time is whether to accept Camp Bird's exchange offers or whether to retain tin holdings. There can be few shareholders who have not already benefited from market rises since Camp

Bird started its campaign. Tin is currently a strong market and looks like remaining so for the time being, and on the face of it, to exchange tin shares for Camp Bird would appear to be throwing away the chances of further capital gains. Indeed, if Camp Bird is regarded as a sufficiently promising growth investment, shareholders are free to make purchases for themselves.

Already Camp Bird has been forced to step up its original exchange offers. These, it will be remembered, were to have been based on average middle prices of Camp Bird and tin shares over the period July 27 to September 21. The current proposals, based as they are on present market prices, are a good deal more advantageous, although still extremely low in terms of asset values. Having done this once, surely Camp Bird would be prepared to do it again. Certainly, the tone of Mr. John Dagleish, the chairman, in his latest circular to shareholders of Pengkalen, Ipoh, Chenderiang and Gopeng—all of which have proposed capital returns—seems to suggest a fight to the finish. "We shall continue with our plans until a sufficient number of tin mining shareholders come to our side and enable us to put into operation the major plan of consolidation. . . . We shall do it anyway, but it would be better and cleaner to do it now".

These are not the words of a man who is prepared to accept defeat easily. The lesson to shareholders thus seems to be clear—take no action to sell out or exchange until the two parties start their bidding. There is still plenty to go for.

ALL HANDS TO THE PUMPS AT MERRIES

Merriespruit, the most recent entrant into the list of Orange Free State gold producers, is now experiencing serious water trouble. Water has been the common enemy of most of the developing mines in the Orange Free State but the situation at Merriespruit is somewhat exceptional in that it would appear to be the first time in recent South African mining history that a fully producing gold mine has been compelled to cease mining operations because of flooding.

Cementation techniques have been used with spectacular success in several of the developing mines, particularly at Free State Geduld three years ago when the company twice lost the use of its No. 2 shaft through inrushes of water. In a producing mine, however, where development work underground is more advanced, flooding is obviously a much more serious matter than in a developing mine because of the larger area that can be flooded and which has to be reclaimed by subsequent dewatering operations.

The present situation at Merries is that an inrush of water two weeks ago drowned the company's No. 1 shaft and although 50 ft. concrete plugs were put in the No. 1 and No. 2 shafts at critical

points, the tremendous pressure of water built up inside the fissure smashed through the concrete plug in the No. 1 shaft, poured through into the No. 2 shaft over a mile away, and during the past week had risen to approximately 1,500 ft. above the concrete plugs.

No information is available in London as to how far the 14 in. pipeline protruded above the concrete plug at the time of the break-through but it is unlikely that it was more than 30 or 40 ft. This may complicate the task of dewatering, but the air and water pipe lines should be available for use for cementation purposes. It is presumed that cementation will precede the pumping operations and that to be effective a pre-determined head above the level of flood water will be required to enable the liquid cement to be forced into the fissure area.

The recovery of the shafts will, in any case be difficult and costly, and may be delayed by lack of pumping capacity, although it is understood that a dewatering programme has been drawn up.

In terms of profit and loss the cessation of mining operations might very well represent a monthly loss of working profits of £50,000, plus £50,000 to £100,000 a month in unavoidable costs, and it might well be anything from three to six months before mining operations can be resumed. The question of finance is not, of course, an immediate problem as it will be recalled that Kennecott increased their loan facilities to Merries last May by £1,500,000.

ZANDPAN DISCLOSURE DISTURBS

The most disturbing revelation last week that the gold assays in boreholes Z.5 and Z.6 on Farm Zandpan 43 in the Klerksdorp district of the Western Transvaal were not reliable, has cast doubts—and rightly so—on the method by which borehole cores are assayed and checked by the companies concerned. It may be recalled that borehole Z.6, in a first deflection, gave the high value of 3,935 in. dwt., while two deflections of Z.5 borehole intersecting the Vaal Reef gave 1,075 in. dwt. and 1,259 in. dwt., respectively.

That these results are not to be regarded as reliable came to light when the "other half" of the core was subjected to assay tests and yielded results far below those published.

The matter is now being investigated by the South African C.I.D. and while it can be said that a minimum amount of damage to market confidence has been done as Zandpan has not yet been publicly floated, it is obviously going to be necessary to review the present routine for the assaying of all borehole cores. At the time of the Erfdeel-Dankbaarheid affair it was suggested that all borehole cores should be assayed by the Government Mining Engineers' Department and the recurrence of "salting" should act as a strong support for this proposal being accepted.

MARKETS OVERSHADOWED

Events in the Middle East and in Hungary dominated stock markets on both sides of the Atlantic. In America they offset the re-election of Mr. Eisenhower and, after opening firm on Wednesday, Wall Street quotations fell away so that the *Dow Jones Industrial Index* fell from a high of 496.60 to 491.15 on November 7 compared with 487.62 on November 1.

International tension put a damper on share dealings in London and the Kaffir market, already under a cloud from the Zandpan borehole assay disclosures and the serious water troubles at Merriespruit, experienced a bad week with the *F.T. Gold Share Index* falling from 73.9 to 73.5.

"Casts", on the increased dividend were a feature in an otherwise weak diamond section. Similarly, Magundi on the impending production position stood out in an uncertain copper market. Tins firmed up on the news that negotiations were proceeding between the Osborne and Chappel and the Tronoh-Malayan groups. Camp Bird dipped to 14s. 6d. St. John d'El Rey remained firm and Beral Tin improved its position. Platinums were little changed on the week.

MOUNT MORGAN'S PYRITE

Our Australian correspondent has drawn particular attention to the pyrite position at the mine which seems likely to disturb Mount Morgan's economy.

Mount Morgan has previously relied heavily upon strong world metal markets to maintain satisfactory earnings, but falls in the copper price have necessitated dependence upon other sources of income. It had been hoped that pyrite resources would contribute some £A100,000 per year to profits by sale or acid-making in the fertilizer industry. This expectation sprang from the general move to use local pyrite to displace elemental sulphur for acid-making; new plants were established and a bonus approved to help the fertilizer manufacturers to meet the extra cost. But manufacturers prefer brimstone, imports have increased heavily, and there has been an easing in demand for superphosphate.

Mount Morgan is handicapped, in competition with other suppliers of pyrite, by distance from centres of use. And the position has been worsened by the new enterprise of Broken Hill Associated Smelters at Port Pirie, South Australia, in using lead sinter gas for acid manufacture. Apart from the profit aspect, the changing sulphur position will affect ore reserves, which, in 1952-53 were increased to 17,500,000 tons by the inclusion of material, the sulphur content of which would add to the profitability of its working. In the last three years ore reserves have decreased by 1,773,000 tons, and until the market is re-established a further reduction must now result from the pyrite position. Ore mined in the 1956 period was approximately 100,000 tons less than in the previous year; gold content was 0.36 dwt. per ton less, but copper was 0.06 per cent higher.

The position with pyrite is not yet finalized and more may be known at an early date. If it is possible to include this material in reserves, the life of the mine will be appreciably lengthened.

FINANCIAL NEWS AND RESULTS IN BRIEF

Casts Earns Less But Pays More.—With the recommendation of a final dividend of 65 per cent and a bonus of 20 per cent on its issued ordinary capital of £1,516,555 in ordinary stock units of 5s., Consolidated African Selection Trust has raised its total distribution for the year ended June 30, 1956, to 100 per cent from 75 per cent previously.

Combined profits of the company and subsidiaries for the past financial year rose to £2,247,145 from £2,067,447. But, after taxation of £1,385,750 against £1,174,750, the surplus for the year declined to £861,395, from £892,697. No appropriations were made against £351,945 previously and the balance carried forward moved up to £504,181 from £359,805.

Compensation amounting to £1,570,000 received from the Sierra Leone government is being retained in order to meet future capital requirements. But as a result of past allocation to reserves, and the receipt of these further funds, the company has been able to recommend a full distribution of current earnings. It is pointed out that the level of future earnings will be dependent on a variety of somewhat speculative factors. Future distributions may therefore vary from time to time. Mr. A. Chester Beatty is chairman. Meeting, London, December 13.

Sir Lindsay Parkinson in 1955.—The consolidated balance sheet of Sir Lindsay Parkinson Co. at December 31, 1955,

RAND & O.F.S. RETURNS FOR OCTOBER

Company	October 1956			Year ends	Current Financial Year			Last Financial Year		
	Tons (000)	Yield (oz.)	Profit† (£000)		Tons (000)	Yield (oz.)	Profit† (£000)	Tons (000)	Yield (oz.)	Profit† (£000)
Goldfields										
Doornfontein	75	29,858	139.2	J	290	114,518	505.2	203	81,380	339.6
Libanon	93	21,100	51.3	J	384	85,773	217.1	391	84,483	239.7
Luipaards Vlei b	84	14,947	10.0	J	339	60,693	43.7	325	70,859	100.4
Rietfontein	26	5,770	16.9	D	258	58,496	178.1	262	59,782	197.7
Robinson	70	14,778	9.1	D	779	156,720	45.9	832	177,170	190.9
Simmer & Jack	102	18,353	22.0	D	1,018	178,826	171.7	1,195	199,531	174.1
Sub Nigel	66	18,796	51.7	J	266	77,562	232.2	266	84,437	329.7
Venterspost	126	29,849	67.4	J	502	108,609	277.2	495	115,419	314.1
Vlakfontein	50	17,739	87.9	D	446	159,817	790.7	387	142,022	729.0
Vogels a	100	23,800	70.0	D	1,003	248,489	838.4	1,029	265,288	1082.5
West Drie a	75	69,791	578.0	J	300	278,304	2298.0	284	219,207	1746.4
Anglo American										
Brakpan	109	18,478	15.3	D	1,070	181,942	127.7	1,069	182,471	152.7
Daggas a	223	49,954	279.7	D	2,209	499,478	2823.5	2,247	513,300	3142.7
East Daggas	94	15,401	30.0	D	952	156,451	338.8	958	159,634	457.0
F.S. Geduld c	46	20,341	8.2	S	46	20,341	8.2	—	—	—
Lorraine d	59	11,185	L8.6	S	59	11,185	L8.6	44	7,147	L24.9
President Brand a	60	45,815	379.7	S	60	45,815	379.7	51	40,832	337.7
President Steyn a	82	31,981	177.7	S	82	31,981	177.7	81	29,001	160.3
S. A. Lands	89	19,957	80.1	D	898	188,839	650.1	934	177,920	555.6
Springs	127	14,836	8.5	D	1,262	152,672	102.2	1,205	156,549	96.6
Vaal Reefs a, e	52	20,280	107.5	D	292	105,808	497.7	—	—	—
Welkom	80	20,000	34.8	S	80	20,000	34.8	81	16,456	16.0
Western Holdings	88	38,939	251.8	S	88	38,939	251.8	72	27,168	160.8
West Reef Ex. a	118	25,370	57.2	D	1,198	343,210	491.0	1,181	223,054	557.0
Central Mining										
Blyvoor a	105	59,180	435.3	J	433	242,667	1793.9	434	245,425	1855.0
City Deep	165	31,612	10.2	D	1,536	296,897	39.5	1,621	306,894	9.5
Cons. M.R.	168	23,030	9.2	J	673	93,299	39.9	710	99,078	89.1
Crown	284	42,357	2.0	D	2,859	441,816	204.1	3,014	479,860	499.7
D. Roodepoort	189	32,568	35.1	D	1,833	316,048	524.7	1,815	305,792	504.2
East Rand Prop.	214	56,764	181.9	J	2,125	551,497	1681.0	2,131	519,123	1650.6
Harmony a	80	31,218	170.8	J	313	123,310	616.0	278	102,109	516.7
Modder East	144	14,827	10.1	J	564	57,710	36.2	522	54,625	34.0
Rose Deep	45	7,050	0.2	D	442	70,683	5.0	580	90,295	57.9
J.C.I.*										
E. Champ d'Or a	12	339	L25.7	D	138	8,093	L266.8	199	15,591	L333.8
Freddies Cons. a	61	13,479	L23.0	D	608	125,037	L353.2	812	142,773	L485.1
Govt. G.M.A. a	233	30,353	0.2	D	2,346	298,955	16.3	2,450	319,390	L850.0
Randfontein a	218	21,707	L344.9	D	2,282	226,403	L2998.6	2,578	285,111	L3143.2
Union										
East Geduld	147	45,203	329.1	D	1,444	445,541	3187.5	1,494	459,821	3469.7
Geduld Prop.	107	16,756	29.1	D	1,040	165,060	323.4	1,025	166,055	452.4
Grootvlei	205	44,079	244.7	D	1,959	422,119	2302.5	1,942	420,518	2457.2
Marievale	74	19,420	91.1	D	713	187,219	866.7	715	185,259	893.6
St. Helena	120	34,802	196.7	D	1,082	313,951	1710.6	1,040	274,048	1185.2
Van Dyk	81	13,005	2.3	D	801	129,953	16.8	802	131,928	22.3
General Mining										
Elliot a	33	7,096	20.1	D	321	73,499	273.0	307	88,070	415.1
S. Roodepoort	25	1,205	25.6	J	117	27,167	99.8	111	24,882	89.3
Stilfontein a	92	36,913	220.0	D	893	352,085	2077.1	822	286,865	1703.1
W. Rand Cons. a	159	21,735	L93.0	D	2,216	237,079	L945.3	2,364	272,048	107.4
Anglo-Transvaal										
Hartebeestfontein	69	34,155	207.3	J	270	132,153	785.3	193	77,197	334.1
Merriespruit a, f	65	15,763	L3.0	D	571	134,941	L227.9	—	—	—
N. Klerksdorp a	11	1,205	L6.3	D	109	12,410	L50.9	112	13,849	L16.0
Rand Leases	173	26,988	8.5	D	725	111,102	28.3	746	117,515	132.1
Village M.R.	30	4,830	7.9	J	132	20,292	34.6	138	20,331	38.8
Virginia O.F.S. a	90	21,600	56.4	J	351	62,877	215.5	267	56,433	126.4
Others										
N. Kleinfontein	96	11,576	L7.4	D	1,039	122,663	9.6	1,073	127,233	55.2
Wit Nigel	18	3,956	7.0	J	72	15,938	29.6	73	15,889	33.9

L indicates Loss. † Working Profit. * Working Profit includes Sundry Revenue. a Excluding profit from Uranium, etc. b Main Reef only. c Production began Jan 1956. d Production began May 1955. e Production began May 1956. f Production began March 1956.

TIN OUTPUT IN TONS OF TIN CONCENTRATES

Company	July-Sept.	Months since year end		Financial Year to Date		Company	July-Sept.	Months since year end		Financial Year to Date	
		This	Last	This	Last			This	Last	This	Last
EASTERN						Sungei Kinta	67½	9	254½	237	
Ampat	324½	9	1094½	1044½		Sungei Way*	276½	3	276½	503	
Ayer Hitam*	73½	3	73½	212½		Taipong	227	9	603½	499½	
Berjantai	118½	5	285½	400½		Tambah	48½	9	130½	113½	
Chenderiang*	60	6	101½	110½		Tanjong	289½	9	1020½	777½	
Gopeng Cons.*	227½	12	850	759		Tekka*	32	6	64½	66½	
Hongkong Tin*	98½	12	407½	400½		Temoh*	70	6	144½	101½	
Idris Hyd.*	54½	9	183½	217½		Tongkah	199	3	199	211	
Ipoh Tin*	72½	6	139	126		Tronoh*	696½	9	1970½	1967½	
Kampong	132½	6	354½	144½							
Kamunting	560½	6	1063½	872½		NIGERIA					
Kent (FMS)	76½	9	178½	207½		Amal. Tin	94½	6	1933	2179	
Kepong*	72½	3	72½	91½		Amal. Tin.†	133	6	259	301½	
Kililinghall*	56½	12	311½	381		Bisichi	213	9	537½	554	
Klang River	98½	6	190½	133½		Bisichi†	91½	9	270½	537½	
Kramat Tin	103½	6	197½	197½		Ex-Lands	168	9	454	427	
Kuala K.	630½	6	1224½	981		Gold & Base	192	9	529	439	
Kuchai	75½	12	422½	737½		Gold & Base†	37½	9	131½	136	
Larut	238½	9	786	757½		Jantar	86	12	305	240	
Lower Perak	384	5	731½	926½		Jantar†	61	12	227	216	
Malayan Tin*	592½	3	592½	591		Kaduna P.	22½	9	56	54	
Malaysiam	21½	6	48½	77		Kaduna S.	59	9	245½	194	
Pahang‡	420	2	420	438		Keffi	12	6	20	—	
Pengkalan*	95½	12	532	420½		Keffi†	78	6	160	181	
Puket Tin*	168½	9	439½	563		Lond. Nig.	89	6	164	118½	
Rahman H.	73	3	73	100½		Lond. Nig.†	35	6	14	—	
Rambutan*	42	3	42	64		Naraguta T.	21½	9	91½	122½	
Rantau	242½	3	242½	186½		Naraguta T.†	21½	9	61	64½	
Rawang Tin	224	6	470½	669½		Ribon	48½	6	87	91½	
Renong	153½	3	153½	204		Ribon†	9	6	17	17	
Selayang Tin*	53	12	222	260½		Tinfields of Nig.	7½	6	104½	114	
S. Kinta	970½	6	1885½	1552		Tinfields of Nig.†	0	6	0	11½	
S. Malayan*	652½	3	652½	754½		U. Tin	25	3	25	42½	
Siamese Tin*	808½	9	2520	1772½		U. Tin†	18½	3	18½	29½	
S. Tronoh*	195½	9	528½	648		MISC.					
Sungei Besi*	360½	6	635	560		Geevor	164	6	341	318	

* Quarterly figures
† Columbite
‡ Two months only

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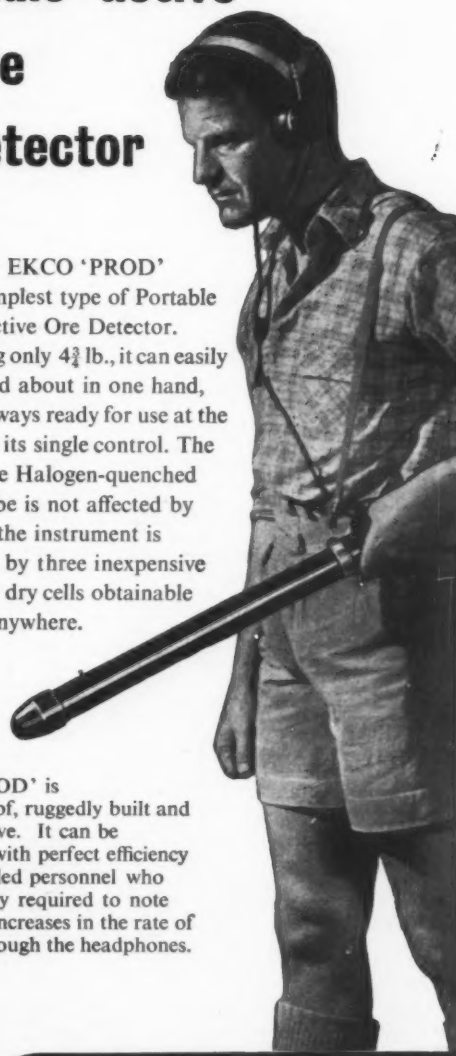
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reveals an expansion of total assets to £3,976,534 from £3,501,630. Current assets at £2,775,275 exceeded current liabilities and future taxation by over £190,000. During its past financial year the group made net profits after taxation of £91,593 compared with £70,246. The balance carried forward improved sharply to £172,406 from £103,921.

In his statement to shareholders, Mr. A. E. Parkinson said that 1955 was a year in which many difficulties were surmounted. To date, 1956 had also not been without its problems, but the company was hopeful that results would show a continued improvement. Meeting, London, November 28.

New Plant for Magundi.—Arrangements have been concluded for the immediate installation of a milling plant capable of producing 300 tons of copper concentrates monthly at Magundi Copper Mines and Minerals' Mtuga Mine. This plant has been assembled for transport to the mine and will shortly be moved on to foundation bases now being laid for it. Preliminary tests indicate a possible recovery of 98.5 per cent to give a concentrate of 30 per cent copper content. Production is scheduled to start next January.

As a result of a rise in the price of chrome, and a firm forward demand for high-grade metallurgical metal, every effort is being made to obtain a reinstatement of the previously existing truck allocation. If this is successful, mining operations could start immediately.

Magundi has also concluded a deal with Anglo Transvaal Consolidated and North Charterland Exploration in respect of large concessions in N. Rhodesia. The company will accordingly receive cash payments together with subscription rights.

Amalgamated Tin Mines.—Total assets of Amalgamated Tin Mines of Nigeria at March 31, 1956, declined fractionally to £3,830,403 from £3,864,051. Current assets of £3,239,598 exceeded current liabilities and future taxation by nearly £2,000,000. During its past financial year Amalgamated Tin's net profits—after a contingencies reserve of £20,000 (nil)—moved up to £510,866, from £502,069. Dividends absorbed £504,562 (£494,812) and the balance unappropriated increased to £280,763 from £274,459. Mr. J. Ivan Spens is chairman. Meeting, London, November 16.

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MR. S. G. MENELL'S REVIEW

The 24th annual general meeting of Rand Leases (Vogelstruisfontein) Gold Mining Company, Limited will be held on December 6 in Johannesburg.

The following is the review by the chairman, Mr. S. G. Menell, which has been circulated with the report and accounts:

The improvement in results achieved during the previous year ended June 30, 1955, was not maintained during the year under review due to a decline in the grade of ore available for mining. The tonnage milled decreased by 84,000 tons to 2,143,000 tons and the recovery grade, at 3.174 dwt. per ton milled, was 0.119 dwt. per ton lower. These factors, together with a slight decrease in the average price of gold, resulted in a reduction in the revenue per ton milled of 1s. 4d. to 39s. 11d. Working costs increased by 1s. 5d. to 38s. 1d. per ton milled.

The total profit, including sundry revenue, for the year was £253,253, equivalent to 2s. 4d. per ton milled, as compared with £582,789, equivalent to 5s. 3d. per ton milled in the previous year. Your Company has not benefited from the revised taxation formula which came into effect as from January 1, 1956, as no formula tax was payable for the year.

In terms of the Pneumoconiosis Act recently promulgated, the liability of Gold Mines for Silicosis and similar complaints has been increased. While the actuarial assessment of the additional liability payable by individual mines has not yet been finalized, it is estimated that the additional amount payable by your Company from August 1, 1956, will be approximately £6,000 per month, which will have the effect of increasing working costs by an average of about 8d. per ton milled.

Except for a slight improvement in the percentage payability of the footage sampled on Bird Reef, there was an overall decline in the payability and value obtained in development.

The total ore reserve, recalculated as at June 30, 1956, amounted to 3,852,000 tons, having an average value of 4.00 dwt per ton over a stopping width of 47.3 inches. Compared with the ore reserve as at June 30, 1955, there is a decrease of 866,000 tons with decreases in the value of 0.16 dwt. per ton and in the stopping width of 0.7 in. The ore reserve on Bird Reef showed an increase of 15,000 tons, but those on Kimberley Reef and on Main Reef Series showed decreases of 191,000 tons and 690,000 tons, respectively, due to increases in pay limits, and to decreases in payability of development on these reefs.

Operations

No. 1 Tertiary Shaft was completed during the year. The engine chamber and rope race on the 35th level were excavated and supported and the permanent winder was commissioned during October, 1956. The loading station below the 42nd level, the spillage arrangement and sump at the shaft bottom and the ore-pass system from the 37th level to the loading level have been completed. Crosscutting to the reef

horizon has been commenced on all levels.

Since the close of the year, 38-0 drive west, an exploratory drive into the western portion of the mine, was advanced a further 692 feet on reef. The values obtained continued to be disappointing and the drive west was stopped, work now being concentrated on driving eastwards to make a connection with the Tertiary Shaft. No appreciable tonnages of payable ore have been exposed up to the present time.

Due to the small percentage payability disclosed in the lower levels of the Main Reef Series in the western portion of the mine, development work in this area will be curtailed in order to concentrate on the area served by No. 1 Tertiary Shaft. Simultaneously, development on the Bird and Kimberley Reefs will be confined to the areas of known payability and the total monthly footage advanced will be reduced to approximately 5,000 feet, as compared with an average of approximately 6,750 feet per month for the year under review.

A programme of intensive sweeping and reclamation has been commenced in the upper levels of the mine where sampling has indicated that greater profitability can be expected from the ore available than from that now being drawn from certain areas on the Bird and Kimberley Reefs. Stopping operations, on these latter reefs will be gradually reduced and the labour thus made available will be transferred to sweeping and reclamation operations and to stopping on the Main Reef Series. The tonnage duty in these areas will, however, be less than that obtainable on the Bird and Kimberley Reefs where stopping widths are above the average for the mine and a small reduction in tonnage milled is anticipated.

In addition to causing the marked drop in the ore reserve, the increase in pay limits has reduced the amount of payable stope face available for mining, thereby further curtailing the flexibility of operations and rendering the mine more vulnerable to seasonal fluctuations in the labour force.

This concludes my review of the year's operations and I desire to place on record your Board's appreciation of the services rendered by the Manager of the Mine, Mr. A. L. A. Forder, and his staff, as well as the staff at both the Head and London Offices of the Company.

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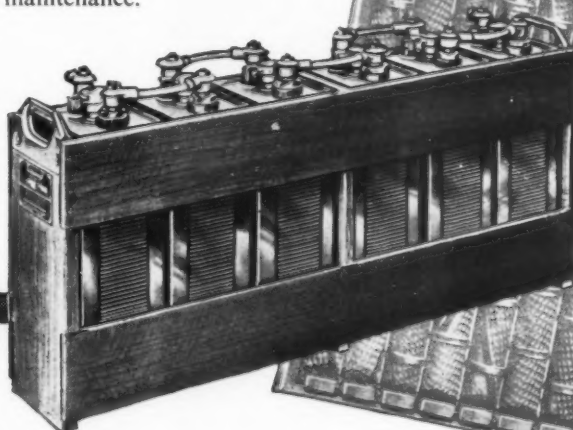
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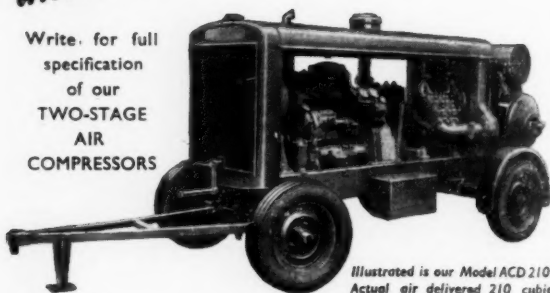
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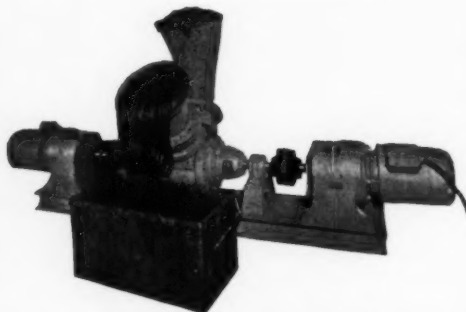
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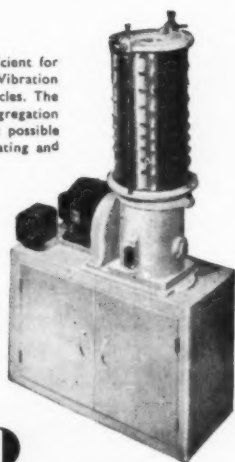
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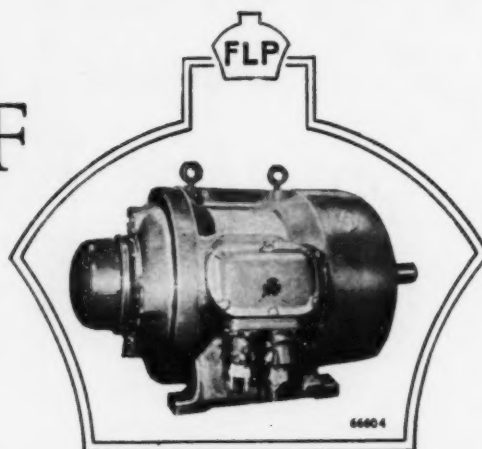
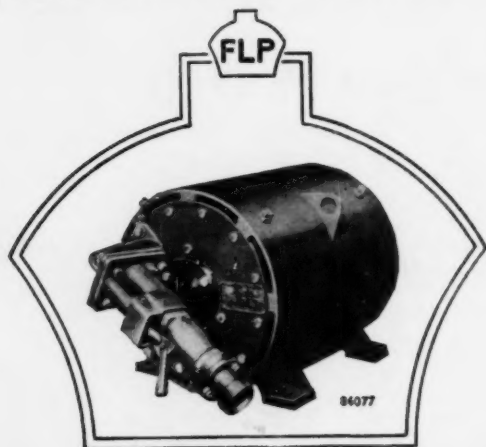
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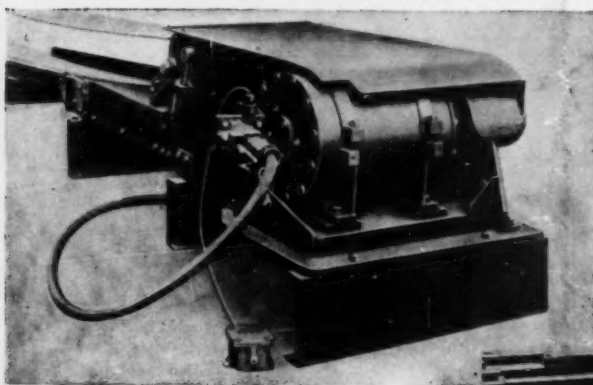
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FLAMEPROOF



Top Left: *Totally-enclosed fan-cooled flameproof squirrel-cage motor, type KF.*
 Top Right: *T.E.F.C. flameproof slipping motor, type FW.*

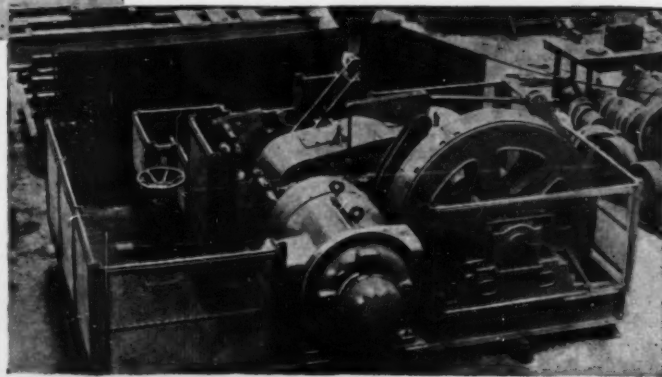
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Above: *Type KF flameproof motor driving a "Huwood" conveyor.*

Right: *125 hp, 580 rpm totally-enclosed, fan-cooled, flameproof Metrovick slipping induction motor driving Beckett and Anderson "Man-Riding" haulage for a colliery. Electro-hydraulic thruster operating main brake is seen on left of motor.*



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